IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication SEPTEMBER 7, 1961

New Orders and the ARMS BUILDUP

The Hardware - the Timing - the Volume

p. 67

Coextrusion: New Shapes With Nonmetallics p. 99

EDM: A Spark in Capital Goods p. 72

Digest of the Week p. 2-3

HOB TWO FOR THE PRICE OF ONE

By switching to a lead-treated steel, Thor Power Tool Company cut the cost of these idler gears in half. Aristoloy 4620 (leaded*) provided high strength with excellent wear and shock resistance qualities. On gear cutting operations, machinability jumped from 35% to 66% (of B 1112). And there was a marked improvement in surface finish.

If you would like to know more about the production economies of lead treated steels possible on hobbing, broaching, milling, and particularly automatic machining operations, write today for LEADED STEELS CATALOG. Or call your nearest Copperweld representative.

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ARISTOLOY STEELS

DIVISION OF
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STEEL COMPANY

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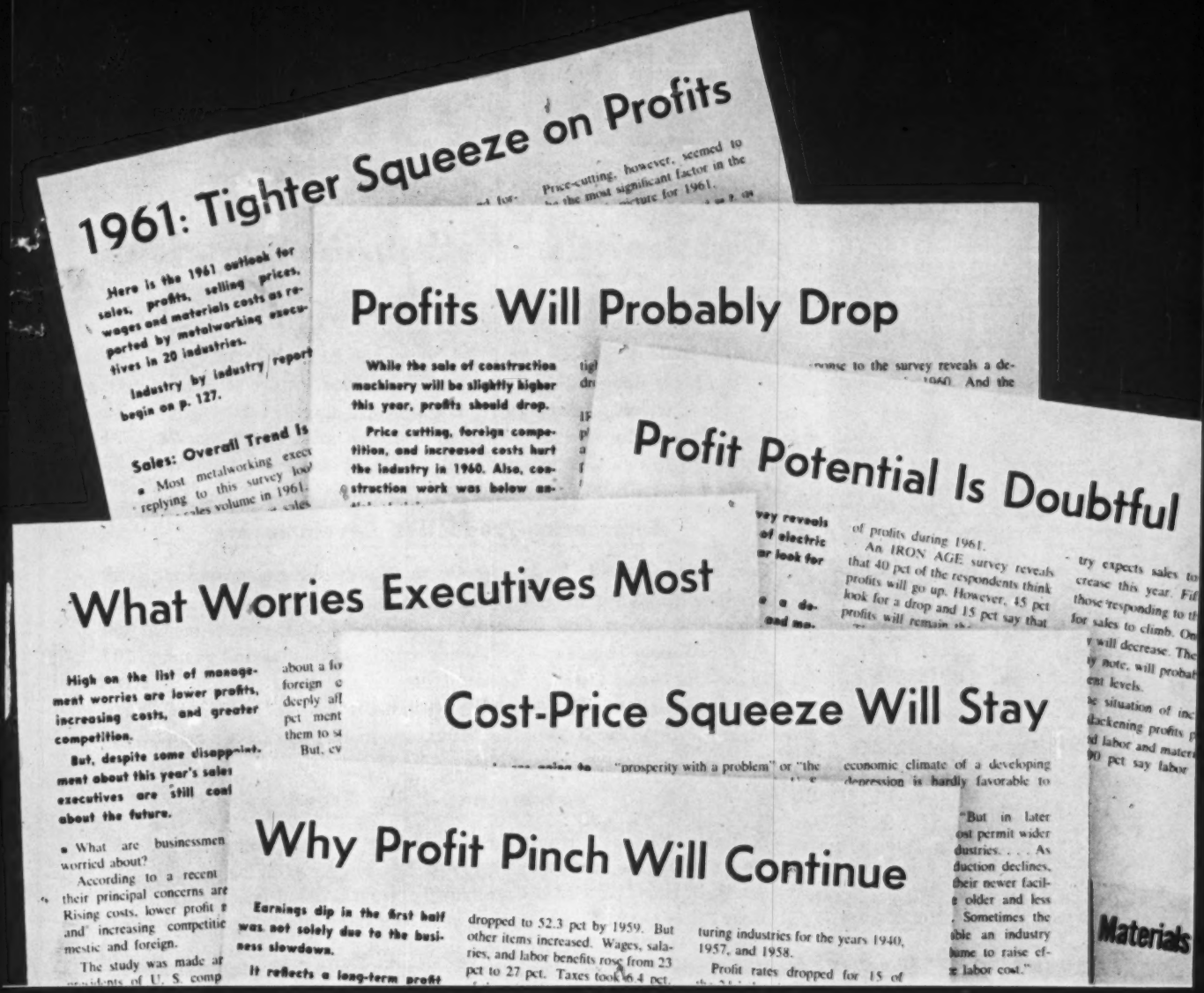
1961: Tighter Squeeze on Profits
Here is the 1961 outlook for sales, profits, selling prices, wages and materials costs as reported by metalworking executives in 20 industries.
Industry by industry report begin on p. 127.
Sales: Overall Trend Is
Profits Will Probably Drop
While the sale of construction machinery will be slightly higher this year, profits should drop.
Price cutting, foreign competition, and increased costs hurt the industry in 1960. Also, construction work was below an-
Profit Potential Is Doubtful
of profits during 1961.
An IRON AGE survey reveals that 40 pct of the respondents think profits will go up. However, 45 pct look for a drop and 15 pct say that
What Worries Executives Most
High on the list of management worries are lower profits, increasing costs, and greater competition.
But, despite some disappointment about this year's sales executives are still cool about the future.
What are businessmen worried about?
According to a recent
their principal concerns are
Rising costs, lower profit
and increasing competitio
mestic and foreign.
The study was made a
Cost-Price Squeeze Will Stay
"prosperity with a problem" or "the
economic climate of a developing
depression is hardly favorable to
Why Profit Pinch Will Continue
Earnings dip in the first half was not solely due to the business slowdown.
It reflects a long-term profit
dropped to 52.3 pct by 1959. But other items increased. Wages, salaries, and labor benefits rose from 23 pct to 27 pct. Taxes took 6.4 pct.
turing industries for the years 1940, 1957, and 1958.
Profit rates dropped for 15 of
"But in later
ost permit wider
dustries. . . . As
duction declines,
their newer facil-
e older and less
. Sometimes the
ble an industry
ume to raise ef-
e labor cost."
Materials

Help?

Try your local service center, if you buy steel in small or moderate lots. That's where the cost of steel (processed or not) is often *less* than the *final* cost of steel you buy from a mill and keep in inventory.

Consider your "costs of possession"—rent, insurance, interest on capital, accounting, handling, wastage, taxes, and a few others. These are costs your service center can help you reduce or completely eliminate. Talk it over today.

Service centers from coast to coast stock top-quality Bethlehem structurals, sheets, plates, bars, tool steels, and alloy steels. And deliver them fast.

Steel

For Strength
. . . Economy
. . . Versatility

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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IRON AGE

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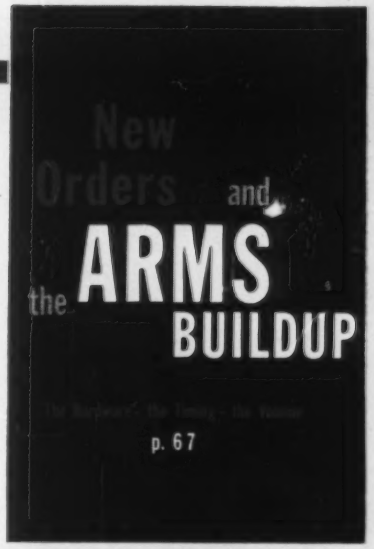


Metalworking Shares in Defense Boom

Metalworking and related industries will soon feel the impact of 1962's $46.7 billion defense budget, biggest military spending since World War II. Defense Dept. will use 10 pct. more metals, perhaps even more steel. This Week's Special Report analyzes the spending pattern, how the budget breaks down. p. 67

Designers Eye Coextruded Shapes

Clad materials offer solutions to many of tomorrow's industrial problems. It's just a matter of time before they're adapted to more metalworking applications. When that phase arrives, the coextrusion process will provide a useful fabricating tool. p. 99

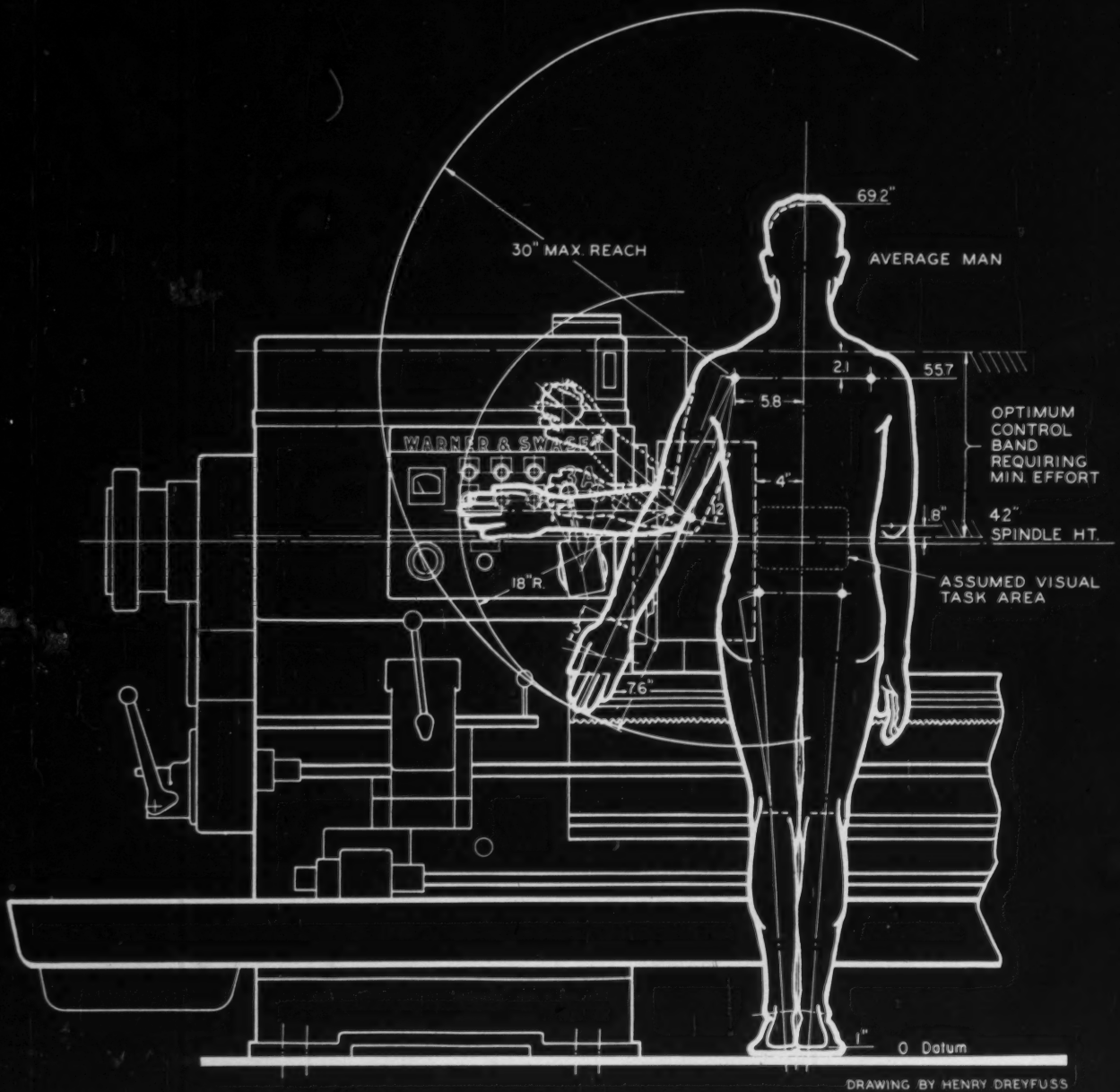
Recovery Fails to Cut Jobless Rate

Labor Secretary Arthur J. Goldberg (right) announced last week the August jobless rate at 6.9 pct. This is the ninth straight month at such a high level, a 20-year record. What sustained unemployment can mean to industry is outlined. p. 70

Next Week

Steelmaking Shapes Nation's Future

Next week's special feature is the third in a series on Metalworking's Technological Explosion. There's no question that the steel industry is headed into its greatest decade of change. A full-color report will cover Steelmaking of the Future.



Ergonomics: it tells us that ideal spindle height is 42″. That main control panels should be dark gray. That Speed Preselector knobs should be at 54″ height, 4″ diameter, and shaped just so. Ergonomics is a science—and a reason why men produce more on machines built by The **Warner & Swasey** Company, Cleveland.

To Our Readers: Please Hear This!

Some may think it isn't kosher for us to let down our hair to you, our tolerant readers. But we have never been too concerned with what others thought about what goes on this page.

We feel honored to be able to talk to you week after week. We know we can't satisfy all of you—nor would we want to. That is not the purpose of our attempts to communicate with you.

Not too long ago we were knee-deep in a series of critical pieces on integrity, American character, welfare state, national debt, and governmental responsibilities. We received several angry letters—some not signed—suggesting we were being political.

The implication was that we either hated our President, or at least we were singing the party (Republican) line.

Others thought we were wasting our time on national or international issues.

A few thought we should either drop dead or at least carry on with pieces about the effect of silica on sulfur in steelmaking.

Such letters make life more interesting, but they do not change the basic reasons for writing as we do.

During the last Administration, we received similar letters—even one from a Cabinet member. They accused us of being unfair, unreasonable, and arrogant. Probably we were, in the eyes of those letter-writers—just as we are to champions of the present Administration.

None of our attempts to explore the hard, tough, and awesome questions of living and working today are political. None are based on ivory tower thinking.

One motive we may have in delving into today's problems of living, working, and surviving is a feeling that we may be losing characteristics which made our nation great.

If we lose our honesty, integrity and toughness; if we give up our quest for truth, our compassion for our fellow man and our ability-to-act in the face of pseudo-cooperation; if, finally, we lose our ability to think of our nation and others first:

Then there will be little left worth saving!

Tom Campbell

Editor-in-Chief

EF

Wire Mesh Belt Furnaces

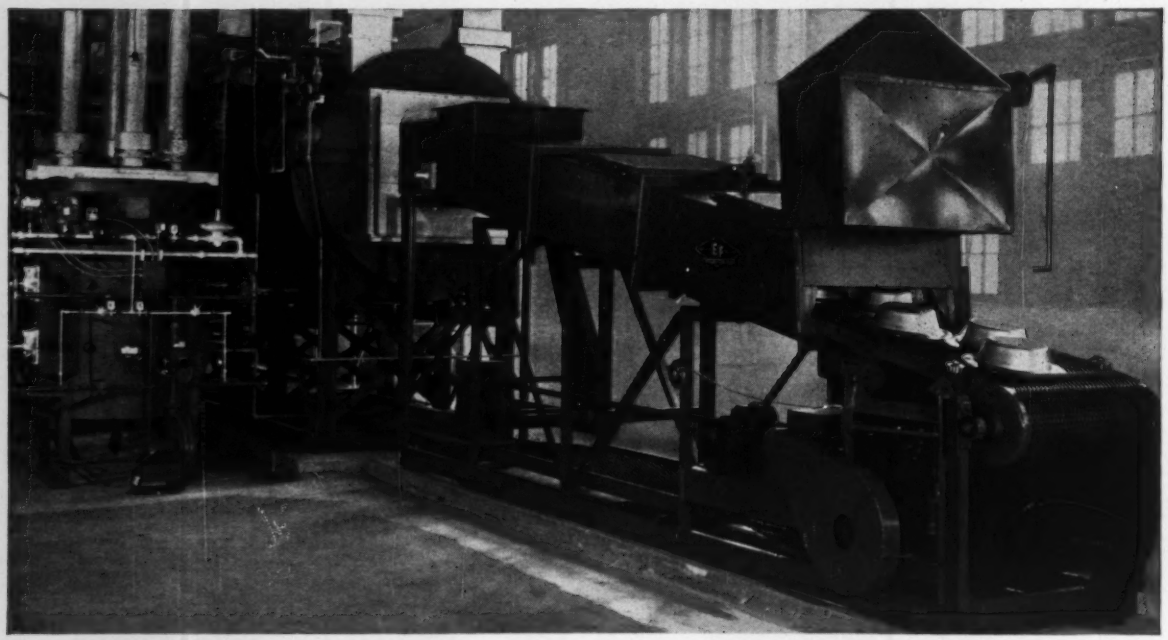
for bright annealing stainless steel and alloy stampings; also sintering, brazing and other heat treating operations.

The EF fuel fired, muffle tube, hump type wire mesh belt furnace pictured below bright anneals 500 pounds of large nickel-chrome alloy stampings per hour at 2150°F in a dissociated ammonia atmosphere. The heat resisting alloy muffle tube protects the materials from contamination by the products of combustion, and the inclined or hump design helps to contain the special atmosphere.

Horizontal straight-through, muffle tube, wire mesh belt furnaces are widely used for sintering ferrous and non-ferrous metal powder products, copper brazing, brass brazing, silver soldering, fluxless copper brazing of stainless alloys, and similar operations.

EF radiant tube fuel fired or electrically heated furnaces, of either hump or straight-through design, can often be used in these services without requiring a muffle.

Call the EF engineers on *every* heat treating problem. Our long experience and extensive research and development facilities can save you both time and money.



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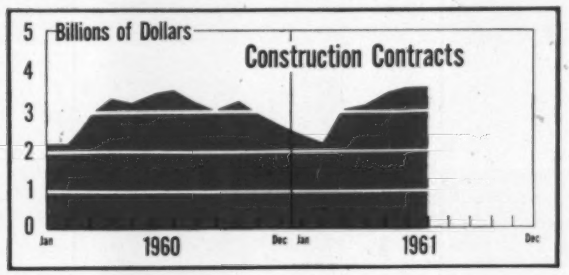
Apartment Building Booms

Contracts for future construction in July totaled $3.6 billion. This is about even with the same high level of June, but off 2 pct from year-ago level.



In July, as in June, apartment building contracts were the big gainers. Residential contracts of $1.5 billion were up 13 pct over year-ago levels. This was due largely to a 59 pct jump in apartment building. Heavy engineering contracts fell off 22 pct from the previous month to $870,000.

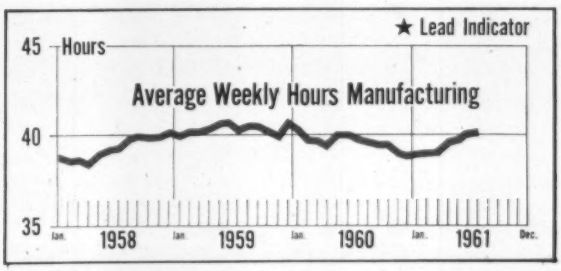
The continued strong showing in apartment building is surprising. Vacancies are growing. And there is reportedly increasing tenant resistance to rents edging up under cost-push pressures. This could indicate a developing weakness in the construction boomlet.

The Workweek Gets Longer

The factory workweek in July rose to 40.1 hours, up from an even 40 hours in June. This is the seventh consecutive month in which increases have been scored.

Workers in durable goods factories are putting in the longest hours. Their workweek is 40.7 hours compared to 39.2 in non-durable goods lines.

The workweek has probably not reached the "saturation" point where workers must be added. This



point must be reached before real headway can be made against jobless ranks—still the big drag on the economy.

In booming 1955, workweek in durable goods industry hit 41.4 hours. This indicates room to go before a substantial "add on" of workers shapes up.

Long-Term Unemployment Dips

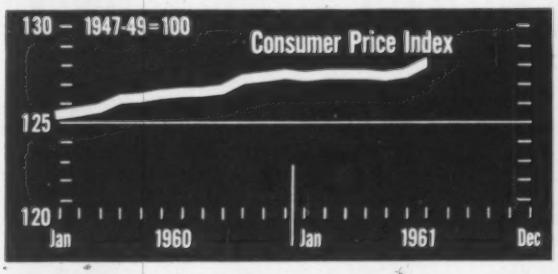
There is one note of hope sounded in the preliminary employment figures for August announced last week by Secretary of Labor Arthur Goldberg. The number of people out of work 15 weeks or longer declined by 200,000 between July and August. This drop is better than seasonal.

But the employment scene is still overcast. As of August, long-term unemployment numbered 1.4 million. And 900,000 of these have been jobless for more than half a year. This is severe as even one day of work takes a person out of the long-term data.

Consumer Prices Hit New High

Consumer prices rose to a record high in July. The consumer price index reading for the month was 128.1. The 0.4 pct rise from June represents the largest monthly increase since October, 1960.

No threat of inflation is carried in the data. Food



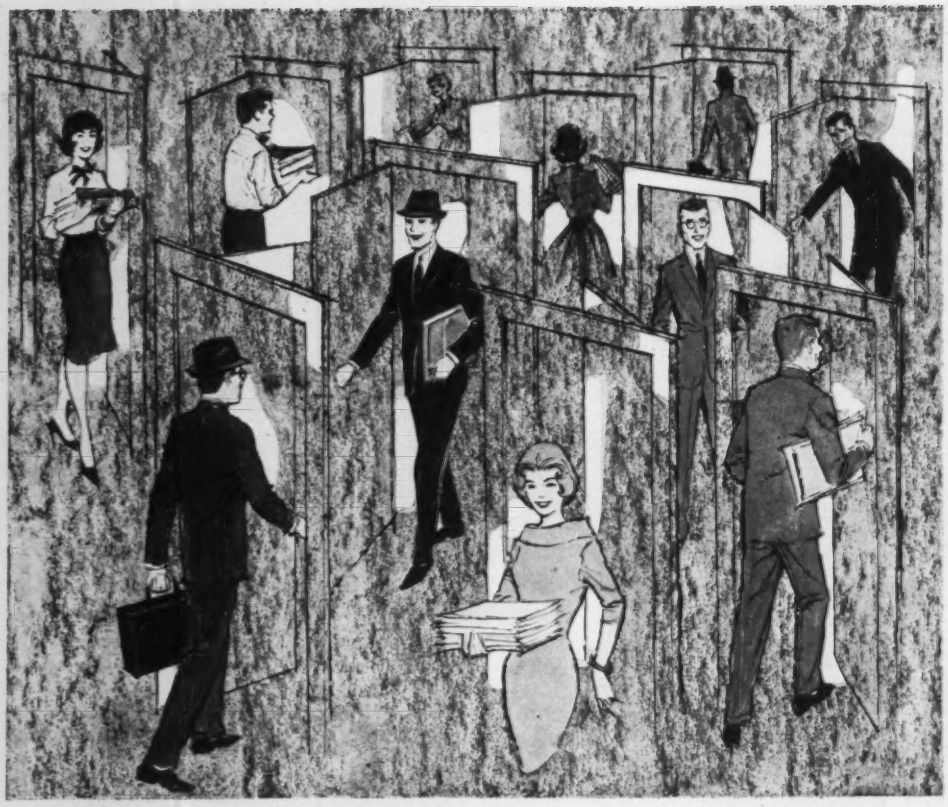
price gains accounted for most of the rise. And these gains are expected to be countered by lower prices in many food lines in August.

Durable goods prices, as reflected in the index, remained firm. Only used car prices showed higher tags.

Auto Sales Swell GNP

The most newsworthy point mentioned by Commerce Dept. Secretary Luther Hodges at a press conference last week: GNP should hit about $540 billion at the end of the year.

This means that Mr. Hodges, for one, expects no prolonged trouble in the auto labor situation. His own department points out that the increase in auto sales accounted for nearly half the rise in total GNP between the first and second quarters.



Open Sesame

Tens of thousands of doors of every description, in many of the most distinguished homes, commercial and office buildings, are equipped with the famous hinges produced by The Stanley Works, New Britain, Conn. In fact, because they provide advanced styling and long-lasting beauty to what had always been considered "stock hardware", Stanley hinges are specified by knowledgeable architects and industrial designers the world over. The name Stanley has become a byword wherever hardware users want more than function alone.

STANLEY ADDS BEAUTY AND STYLE TO PROSAIC HARDWARE WITH THE HELP OF TEN-YEAR OLD MEAKER AUTOMATIC PLATER

To most people, a hinge is a piece of hardware on which doors or piano tops swing open and closed. Today's architects and industrial designers go beyond function alone when specifying hinges, however, for they must complement modern materials and sleek design elements.

With the help of a MEAKER AUTOMATIC PLATING MACHINE, Stanley Hardware Division produces a family of hinges with advanced styling and life-time attractive finishes, specified for distinguished buildings the world over.

According to Stanley management, their MEAKER "AUTOMATIC" has also helped expand markets by providing a variety of durable finishes unmatched by competitive manufacturers. Typical, is a new forged bronze paumelle hinge for flush interior doors, finished in beautiful satin chrome, to complement interior decor.

What's more, absolute minimum down time has been recorded since the MEAKER "AUTOMATIC" was installed *over ten years ago*. During this time, Stanley has also processed literally tons of chrome or nickel finished products of their hardware division, on their MEAKER.

To expand markets by getting the jump on competition, more and more progressive manufacturers are turning to MEAKER AUTOMATION ENGINEERS. Our catalog, WHEN TO AUTOMATE, gives valuable pointers for improving profits through automatic plating or metal finishing.

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SINCE MEAKER 1899

Teamsters: Trouble In Cleveland

Rebellions within the Teamsters Union continue to swell up.

A Cleveland truck owner-operator, Patrick Pace, has called on fellow owner-operators to secede from the union. He claims he has the support of other owner-operators who don't want to be identified for fear of retaliation. Most do contract hauling of steel. They lease their trucks to trucking firms.

Mr. Pace says the owner-operators pay $4.50 per month in dues to the Teamsters but get nothing in return. He says the union doesn't want them to own trucks.

He has formed a brokers' association to spearhead the fight and plans a mass protest soon.

Other recent Teamsters rebellions have taken place in Cincinnati, Chicago, and St. Louis.

Rail Unions Make Bid For 25¢ Wage Hike

The 11 non-operating railroad unions have served notice they want a 25¢-an-hour wage increase, to be effective Nov. 1. They also want the railroads to give six-month advance notice on layoffs to the affected workers.

The wage hike demand stems from the fact the unions believe their 600,000 members were shortchanged last year. They contend there are "inequities" in the wages paid various rail workers. But last year they were granted only 5¢ by an emergency board under the Railway Labor Act. Their demands, put forth in 1959, asked much more.

Now, says George Leighty, chairman of the joint non-operating unions' negotiating committee: **"With due regard for the public and our desire to avoid a transportation tieup, the non-operating workers sacrificed their just demands and went along. This year, however, we intend to get a fair wage settlement."**

However, it isn't likely that the government will let the unions tie up rail transportation with a strike.

Machine Tool Wages Might Go Up

Hearings are underway in Washington which could boost wages in the machine tool industry. The hearings are to determine the minimum wage for the industry under the Walsh-Healey bill. The questions:

1. What is the prevailing minimum wage in the industry?

2. Should the wage be determined on a regional basis (as management wants)? Or should it be a single determination (labor's side)?

3. Is the government wage survey of the industry too high (management's point)? Or is it too old to reflect present conditions (labor's side)? The survey was made in April, 1960.

UAW: GM in the Spotlight

Federal Mediation Director William E. Simkin—and the prospect of $10.9 million in holiday pay for its members—induced the United Auto Workers to extend its current contract and negotiations with Big Three automakers until at least Sept. 6.

At the same time, the negotiations spotlight settled on General Motors Corp. while Ford Motor Co. and Chrysler Corp. faded into the background.

The union singled-out GM as its target for a strike if talks don't succeed. And UAW president Walter Reuther pulled up a chair at the GM negotiating table for the first time since opening of talks with the Big Three.

By picking GM, Mr. Reuther conceded that American Motors Corp.'s "progress sharing" bombshell would not be dropped on the Big Three. And he admitted as much when he said the union "is not insisting that GM travel the same road" of profit-sharing.

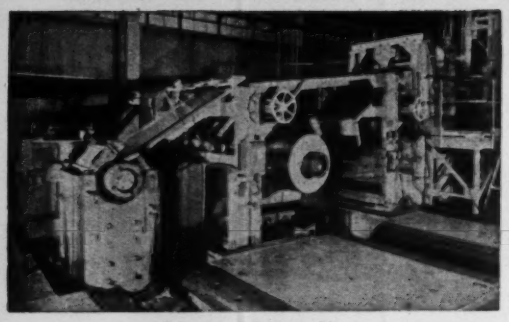
But, the union leader said, the UAW is "insisting that GM workers get the same benefits in the same broad areas." In short: The union is demanding short workweek pay, fully-paid insurance, more liberal SUB and pensions, and retention of both the annual improvement factor and cost-of-living provisions.

He indicated he didn't care whether these demands are paid for out of a profit-sharing fund or paid for directly—just so long as the workers get them.

But the entrance of Mr. Reuther indicated it was time to start the industry's well-known all-night bargaining sessions that have, in the past, led to new contracts.

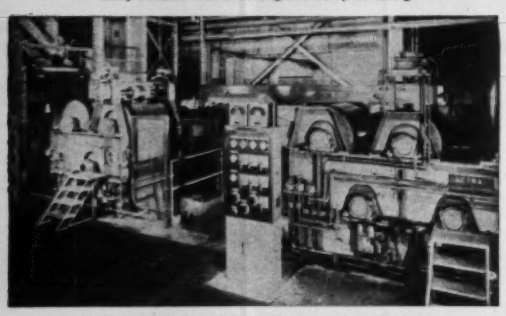
And the spectre of the government, lurking in the background, waiting to step in if talks should fail, was an added inducement for GM to settle as quickly as possible.

Continuous Annealing and Surface Treatment Lines have a lot in common

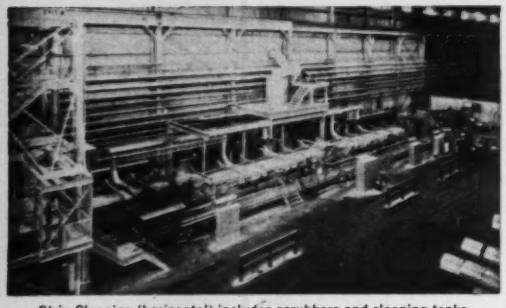


Delivery end shows recoiling.

Entry Section with uncoiling and scrap handling.



Multiple Bridle Rolls help maintain constant tension.



Strip Cleaning (horizontal) includes scrubbers and cleaning tanks.

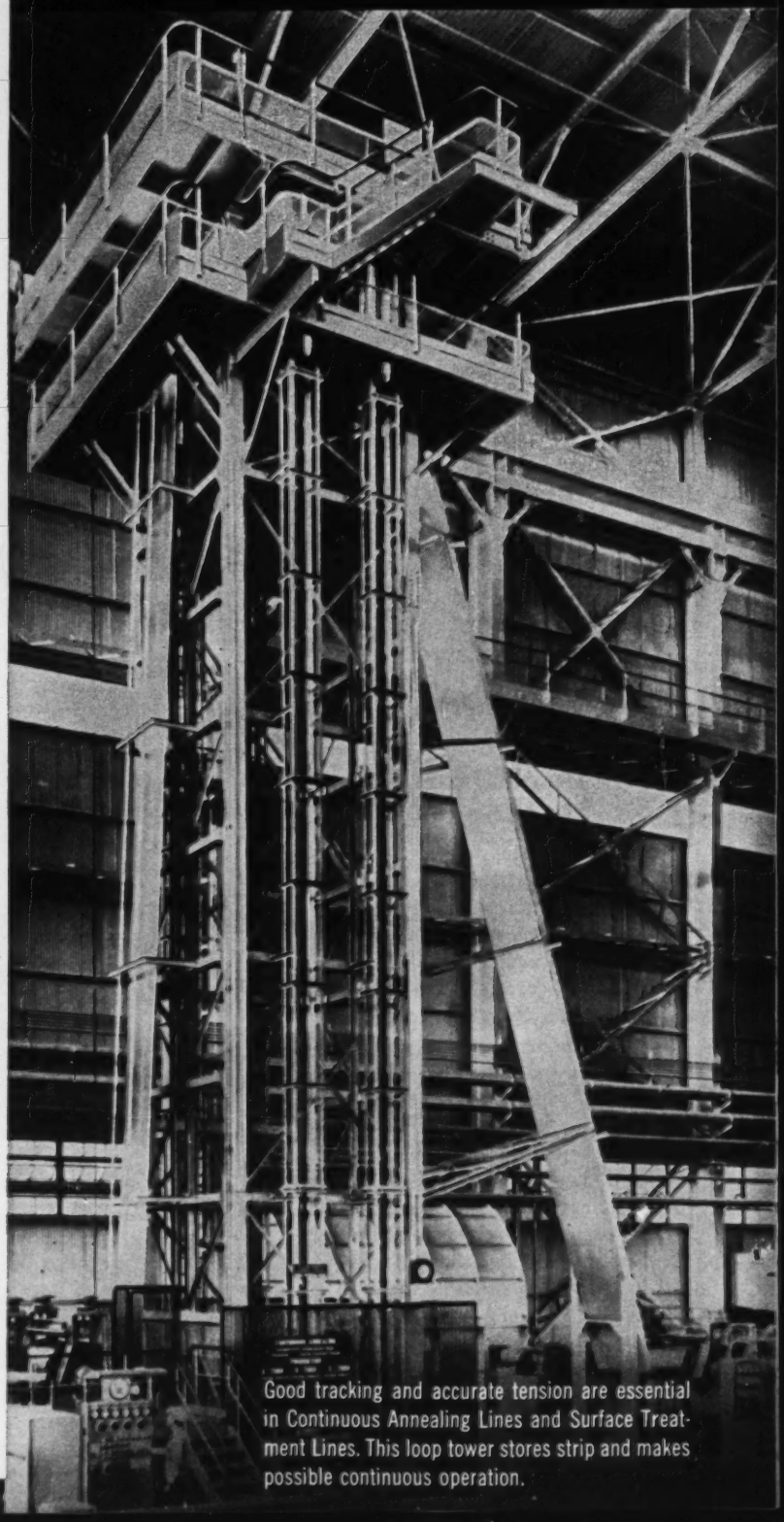
BLAW-KNOX

Aetna-Standard Division

BLAW-KNOX

300 Sixth Avenue, Pittsburgh 22, Pennsylvania

Blaw-Knox designs and manufactures for America's growth industries: METALS: Rolling Mills • Steel Processing Lines • Rolls • Castings • Open Hearth Specialties • PROCESSING: Process Design, Engineering and Plant Construction Services • Process Equipment and Pressure Piping • CONSTRUCTION: Concrete and Bituminous Paving Machines • Concrete Batching Plants and Forms Gratings • AEROSPACE: Fixed and Steerable Antennas • Radio Telescopes Towers and Special Structures • POWER: Power Plant Specialties and Valves



Good tracking and accurate tension are essential in Continuous Annealing Lines and Surface Treatment Lines. This loop tower stores strip and makes possible continuous operation.

★Renegotiation: An Extension?

Powerful forces in Congress already are forming behind moves to extend defense contract renegotiation rules. The Renegotiation Act of 1951 is due to expire June 30.

But unless industry mounts a major offensive against the act, Congress will undoubtedly extend it. There is even a chance it could be voted into permanent law.

Semi-mobilization, such as that for the Berlin crisis, and continued upward spiraling of defense contracts hamper industry moves to end renegotiation.

Renegotiation is a profit control act which came into being as a wartime measure.

It is an after-the-fact look at a contractor's profit and performance. And it can end in profit limitations.

Right now, renegotiation is just a small, gray cloud far in the distance. But when Congress reconvenes in January, the cloud will be big and black right over the U. S. Capitol.

In January, the joint Congressional Committee on Taxation will make a detailed report on the status of the Renegotiation Act. The committee probably will recommend limited extension. The renegotiation board, which administers the law, will make its recommendations to Congress. It is hard to visualize the board members recommending themselves out of a job.

Hearings will be held on whether or not to extend the act. Industry may have its chance for an offensive then. But it should start long before that. By June 30, 1962, Congress will vote on the matter.

The vote is a long time away, but Congressmen have preconceived ideas about renegotiation. Many feel like Rep. Carl Vinson (D., Ga). Congressman Vinson told The IRON AGE: "I've voted for extension of the act in the past. And, though it's a long time away, I see no reason to change my mind. I'll study the committee report before making my final decision. But, right now, I'm for extension."

Industry has opposed, and will oppose, the act on these basic grounds: 1. Profit control has no place in the American economy. 2. Renegotiation penalizes low cost and efficient production, therefore discouraging close cost control.

■ Kennedy Asks No Steel Price Hike

President Kennedy took over leadership of the "no steel price rise" group last week when he said he was "hopeful" that the Oct. 1 steel wage hike could be absorbed.

His predictable comments followed the line of Democratic Senators and of his own council of economic advisors. (IA, Aug. 31, p. 55) And they complete the circle of Administration and Congressional figures joining the moral suasion fight against steel price increases.

The President also blamed most inflation before 1958 on steel prices and attached price stability of the past three years to the fact that steel prices are largely unchanged.

"So," the President concluded, "I am very hopeful that these private companies will, and I am sure they will, concern themselves with the public interests that are involved in their decision."

Referring to his economic advisors' report (details first disclosed by The IRON AGE, June 8) Mr. Kennedy said he was informed "it would be possible for the steel companies to absorb the increase (coming Oct. 1) without increasing prices, and still insure to the steel companies and their owners a good profit."

■ Pounds Will Disappear

It may be a good idea for businessmen to brush up on the metric system of weights and measures. There's a chance they'll be using it in the future. As wild as it sounds, don't sell the idea short. A bill pending in Congress to authorize a $500,000 study into "practicability" of replacing pounds and inches with metric measures is supported by the U. S. Dept. of Commerce.

■ Highway Spending Spurs Steel Use

New Federal highway financing plans will spur the use of steel in roadbuilding. For the past five years the Federal road program has used about 1.25 million tons of steel per year. In the next 11 years of the program, steel usage will average more than 1.66 million tons per year.

The pickup will not mean more steel tonnage for roads. But it will reflect an acceleration in roadbuilding. And since the present program looks like it will be complete by 1972 rather than later in the 1970's.

Funds for the 41,000-mile interstate highway system and for secondary roads have been hiked to speed up construction. The $53 billion program had been slowed because of financing problems.

However, new highway use taxes approved by Congress will add $900 million a year to the program for the next decade.

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Service Representatives in Principal Cities

W. Berlin Economy Is Threatened

With world attention focused on the military and political situation in West Berlin, many observers are overlooking the economic stake of that city.

Actually, its economic situation is somewhat unusual. Industries there are exporting 75 pct of total output. But they must import practically all raw materials. Since the city is virtually a Communist-surrounded island, any break in transport routes could be devastating.

Almost one-third of West Berlin's 10,000 businesses are industrial.

W. BERLIN: An island in a sea of economic peril . . .

This accounts for 61.6 pct of the total employment. And it's responsible for 55.3 pct of the total sales. Also, West Berlin's industries are big customers for U. S. goods. Imports into the city in 1960 totaled $2.1 billion.

Inflation Curbs

The Austrian economy has now reportedly entered a "boom" phase that appears of such long duration that government agencies are asking that inflation curbs be imposed.

Commercial loans are the chief danger signal. They may exceed bank deposits by almost 140 pct.

Progress Alliance: Tough Going Expected

At best—and with the utmost optimism—the Alliance for Progress in South America will have tough, rough, and agonizing going. The trouble in Brazil and in Argentina is living and quick proof.

One part of the Plan was for free enterprise to step in and do big things. This, it was expected, would water down socialistic tendencies and provide for private investment and backing. Now that Brazil's Quadros has resigned, and now that an official of Argentina has resigned, the fat is in the fire.

The Reds, the leftists and the extreme nationalists (who interpret all moves as "being told what to do") have been alerted by the Quadros fiasco. Starting the whole fracas was Ché Guevara, Cuba's strong man, ace Communist and trouble maker for the rest of Latin America.

Regardless of what happens now in Argentina or in Brazil, Castro and Moscow will keep the home fires on a rampage. Those Latins who had good intentions to see that reforms in fiscal policies and taxing methods are carried out will think twice now before embarking on such painful—but necessary—projects. And the U. S. will hesitate to crack down on lending largess because of fear that the whole Latin American fabric of cooperation will collapse.

What happens in plush debating rooms or diplomatic meeting in Latin America does not reflect what is happening among the peasants. Dictatorships are ruled out; the U. S. would not dare to openly suggest or recognize any strong-arm comeback of the one-man rule. The people of the Latin lands are being egged on by leftists and manipulated by communistic opportunists.

That does not mean the masses are commies: But it does mean they are "on the march" and do not particularly know where they are going —or care, just so they have a "better life."

An example of unrest: In Caracas, Venezuela, there are about 300,000 unemployed peasants housed in tin or wooden shacks on the hills. They are ready to descend on the city any time there is a crisis. In the interior, where Venezuela government men are struggling to get industrial projects started, there are at least 20,000 unemployed lured to the spot by grandiose gossip of big things. When they got there and the promised land was not existent —yet— the government had to improvise plans to help support the "immigrants." There is a most tragic situation where a city is now being planned for people before the means are ready to provide work and wages for the inhabitants.

Foreign capital, local capital and well-meaning citizens of South America are again "waiting" until the dust settles. Things had been going slightly better until the Brazilian and Argentina fiasco was set off by Guevara—**Tom Campbell.**

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Whiskers Gage Heat

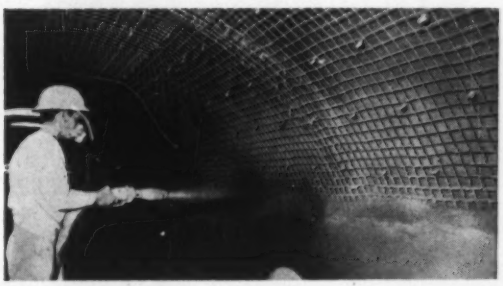
Do you lack space for a conventional temperature probe? If so, perhaps a new whisker sensor may fill your needs. It measures 0.05-in. OD x ¼-in. long. Imbeddable, this tiny gage proves ideal for hot-spot checking wherever a lead wire can be run. Accuracy is within 0.1 pct of full range from –452° to +500°F. Sensing elements are available in tungsten or platinum. Each whisker probe withstands 100-g shocks, pressures up to 5000 psi and 50-g vibrations.

Explosive Forms Diamond

Ripping through a pile of graphite, an explosive shock wave forms a black diamond. Only a one-pound charge, with a force of 3,000,000 psi, is needed to create each of these new low-cost industrial diamonds. Until now, commercial man-made diamonds were formed by using catalysts with high temperatures and pressures.

High-Strength Refractory

Placed by wet- or dry-gunning methods, a high-alumina castable-refractory mix couples low gunning rebound with minimum dusting. This



EASILY SPRAYED: Resists crushing loads.

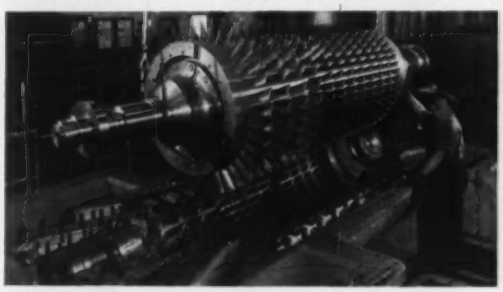
newcomer produces a strong monolithic body that resists severe abrasion and thermal shocks. Recommended temperature uses range up to 2500°. After this refractory is heated to 2400°F, it has a cold-crushing strength of about 4200 psi.

Yields Metallic Coating

A new method of producing metallic coatings has been developed at the Amour Research Foundation. It's called reduced-oxide coating. First, you spray the metal surface with a metallic oxide. Then the sprayed surface is reduced with hydrogen. This technique can be used to apply any readily-reduced metallic oxide, including copper, nickel, tungsten, iron and molybdenum.

More On-Site Oxygen

The largest axial-flow compressor ever built for blast furnace service is now undergoing shakedown tests prior to shipment to a major steel



ASSEMBLE ROTOR: Then tests begin.

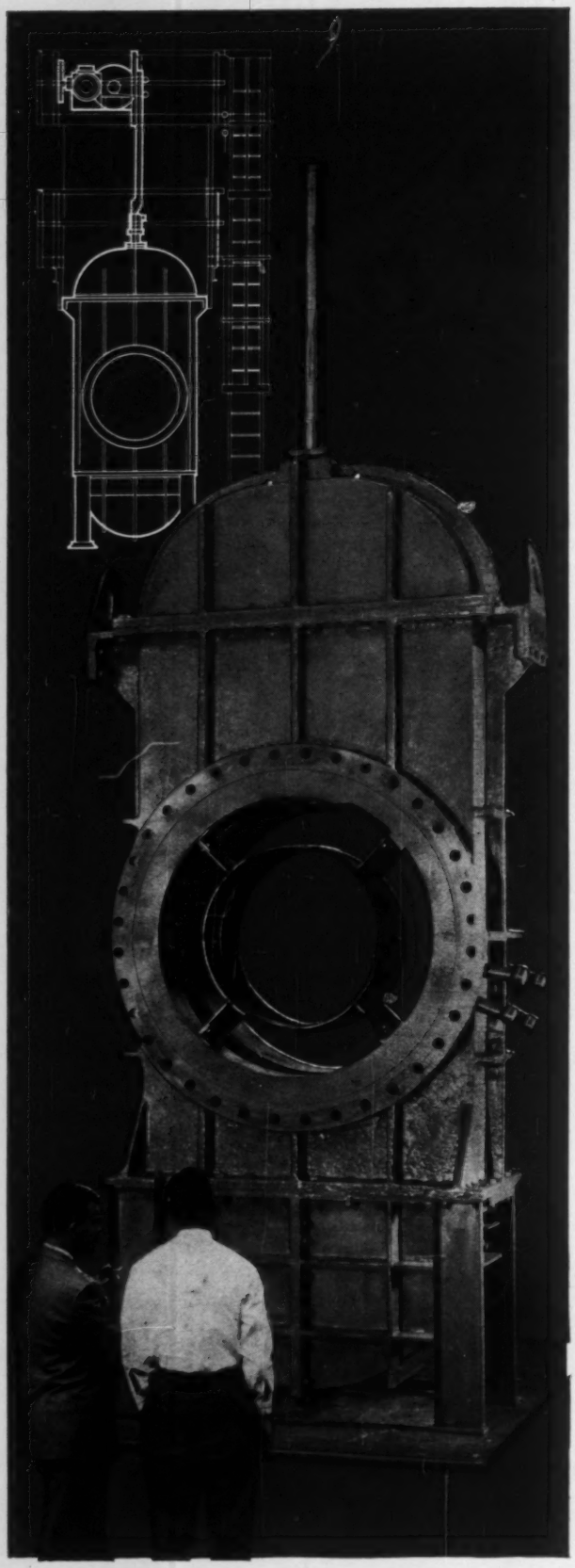
plant. Fully-adjustable stator blades permit carefully-controlled operation over a wide air-volume range. This efficient heavy-duty compressor will turn out ultrahigh volumes of air.

Seals Porous Castings

With only one application, a new impregnating material insures 100-pct casting recovery. Fillers in this impregnator increase progressively in quantity as they decrease in size from 0.0016-0.000004 in. These fillers are inert. They won't stain the cast metal. In addition, their low specific gravity and extreme fineness reduce sludging of the hot, diluted impregnator.

Theoretical Formability

Too often, sheet forming is a hit-or-miss affair. It may take several, costly trial attempts to set up properly for a forming run. A new theoretical approach dissects twelve separate forming processes to show how this work can be done right—the first time. From all signs, this "theoretical formability" approach promises to mark a milestone in sheet-metal fabrication.



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Full Open to Full Closed in 11 Seconds

Valve disc and body are water cooled to prevent overheating while the stove is on blast. Motor-operated drive unit is located on a platform above the valve, well clear of stove heat. This valve is bolted tight to the burner and stove saddle flange, thus preventing leaks at the burner. *Write for Bulletin GB-100.*

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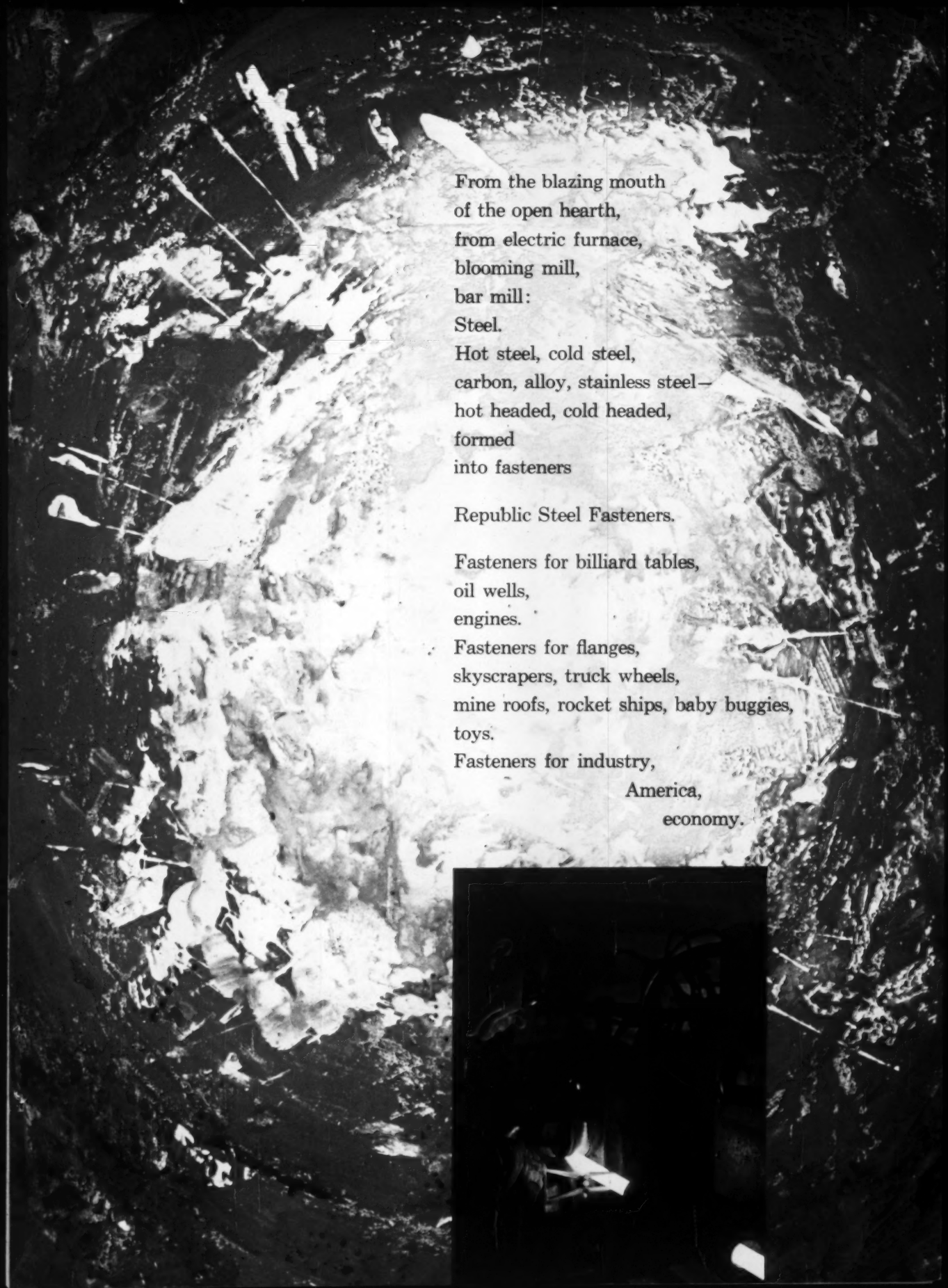

From the blazing mouth
of the open hearth,
from electric furnace,
blooming mill,
bar mill:
Steel.
Hot steel, cold steel,
carbon, alloy, stainless steel—
hot headed, cold headed,
formed
into fasteners

Republic Steel Fasteners.

Fasteners for billiard tables,
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mine roofs, rocket ships, baby buggies,
toys.
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Induction heating coils designed and built by Electromechanical Laboratory, Republic Steel. Instantaneous induction heating eliminates scale problems, resulting in higher quality hot formed nuts and special forgings for demanding tasks

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One million fasteners.
Stove bolts, wheel bolts, ladder rods, toggle bolts,
slotted head, rolled threads, flat head, round head.
Makers of machine screws—round, flat, fillister,
cap screws hex head, flat head, washer faced.
Ultra strength construction bolts
high carbon heat treated.
Binding steel.

Machines forming carriage bolts,
lag bolts, gimlet point,
derrick bolts, plow bolts,
bolts for America.
Elevator, step bolts,
bolts for security.
Track bolts, switch bolts,
bolts for transportation.
Tap bolts, blank bolts, stud bolts steam tight.

Republic Steel Fasteners.

Republic nuts hug the bolts,
million bolts.
Million nuts.
Hex nuts, square nuts,
finished nuts, Nylok nuts.
Hot forge, cold forge,
mill them out of bar stock.
Double chamfered hexagon,
semi-finished hexagon,
hexagon castellated,
hex full, hex jam,
square.
Nuts.

Republic Rivet Fasteners
round head, flat head, counter sunk,
truss head, core head, button head, pan head.
Cold headed.
Truss rivets, wagon rivets,
coopers, tinners, section rivets.
Count the flow of rivets. Count the pace of building.

Republic Steel Fastening.
Special needs. Special parts.
Engineer, generate
Special
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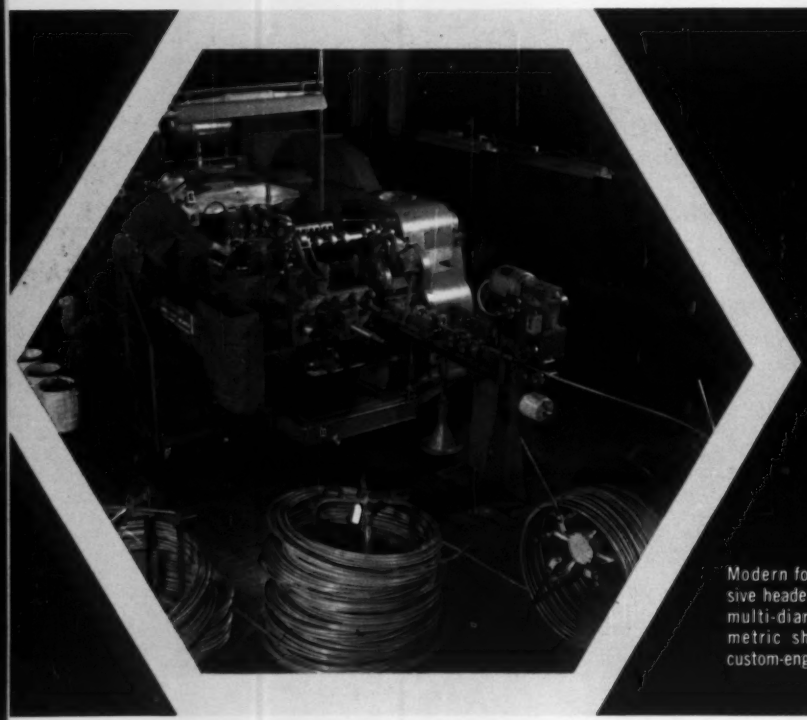
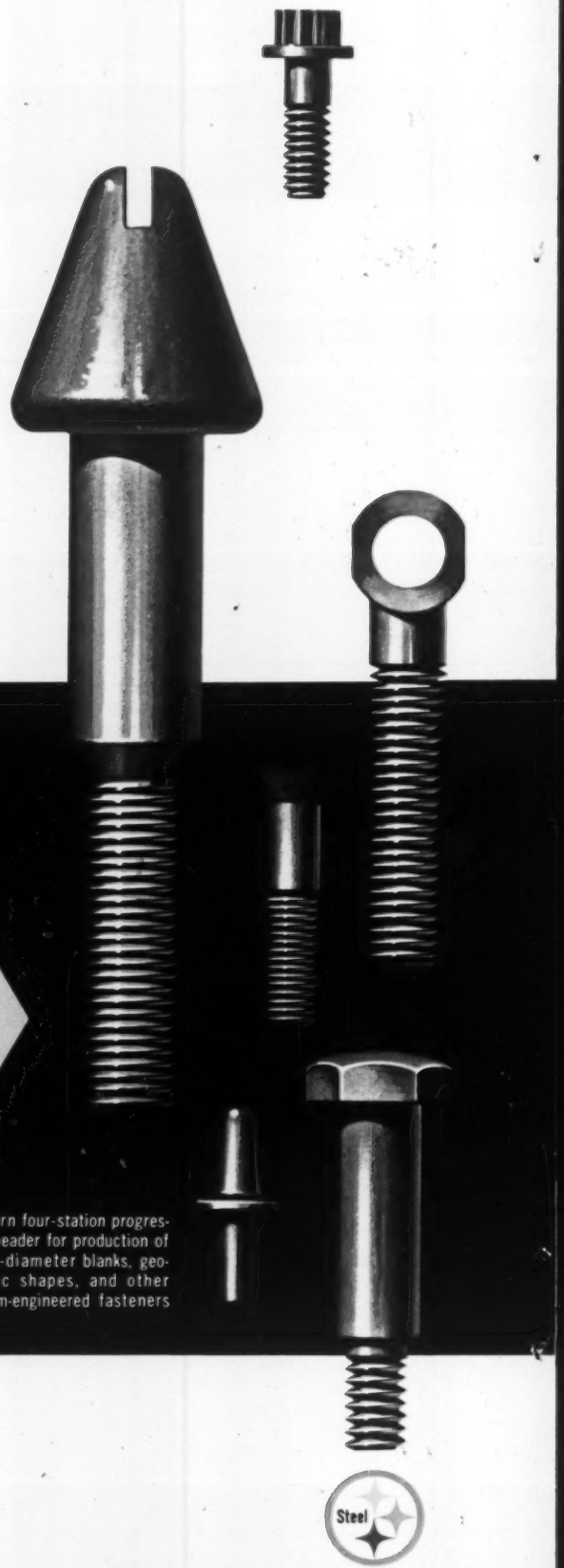
Fasteners.
Cold form, hot form, single source.
Binding,
fastening,
assuring
Republic Fastening.

Power in a nut
Drama in a bolt
Impact in a rivet
Challenge in fasteners

Republic Steel Fasteners.





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Wanted: Details

Sir—We have read with interest the article entitled "Congress Probes R&D Fund Sharing" which appeared in the Washington column in the Aug. 10 issue of The IRON AGE.

Will you please advise where we can obtain full details as to pertinent laws and regulations under which such government financing of research and development work is performed?

We will appreciate any and all information you can give us to assist in obtaining the above regulations —R. L. Refior, President, Lansing Drop Forge Co., Lansing, Mich.

■ **The regulations are contained in Part 2 of Section XV of the Armed Services Procurement Regulations (ASPR)—Contract Cost Principles and Procedures.—Ed.**

Different Point

Sir — Your quotation from my article in Business Horizons as reported in Report to Management (IA—Aug. 17) has been called to my attention.

May I have space to comment that the point I was making in the article was very different from the one you used my quotation to make?

The quotation used is, first, not part of the main theme of my article. And, secondly, I used it to make the point that "professionals" are often a different kind of person than the typical "manager." If we use the criteria (correct ones in my view) we have always used to select "managers" in order to select "professionals," we'll preclude using many of the better ones.—John E. Connor, Elizabeth, N. J.

Wrong Maker

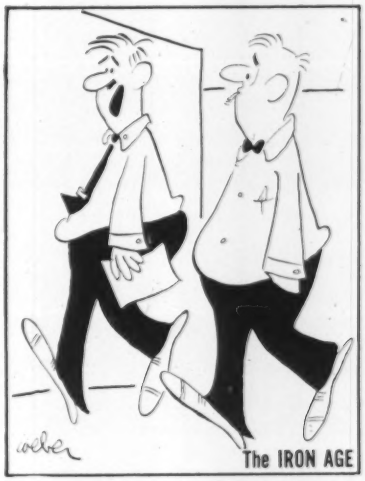
Sir—On p. 69 of your Aug. 17 issue ("Auto Imports Find Rough Going") you have made an error. You quote the British Motor Corp. as predicting it will sell 40,000 sports cars in the United States in the next 12 months.

You said that the company "is doubling output of one of its best U. S. sellers—the Sunbeam Alpine —with almost all of the increase aimed for U. S. shores."

The fact of the matter is that the Sunbeam Alpine is not produced by the British Motor Corp. It is produced by the Rootes Corp., a competitor of the BMC, and builder of Hillman, Sunbeam, Singer and Humber automobiles. These are in contrast to the sports car lines produced by BMC which include: MGA 1600 Mark II, MG Midget, Austin Healey Sprite Mark II, Austin Healey 3000 Mark II.

Although the British Motor Corp. is far and away the largest sports car producer in the world, they also turn out a full line of various sized Marques such as: Morris, Austin, Riley, Wolseley, and Princess. In the Morris and Austin categories, there are many different sizes, models and styles.

As a representative of its distributors throughout the U. S. and its more than 600 dealers, we would appreciate your setting the record straight. — Samuel P. Arnold, Arnold and Co., Denver, Colo.



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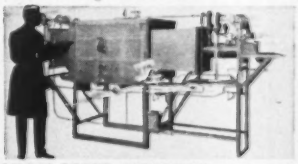
ECONOMICAL, TOO, the Hayes Type M-Y furnace needs only modest power input for temperatures to 3300°F with Moly elements. It can be used with reducing atmospheres for close control research or full-scale production, and is available with metallic or ceramic superhearths.



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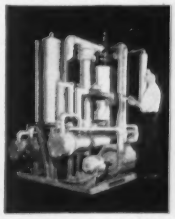

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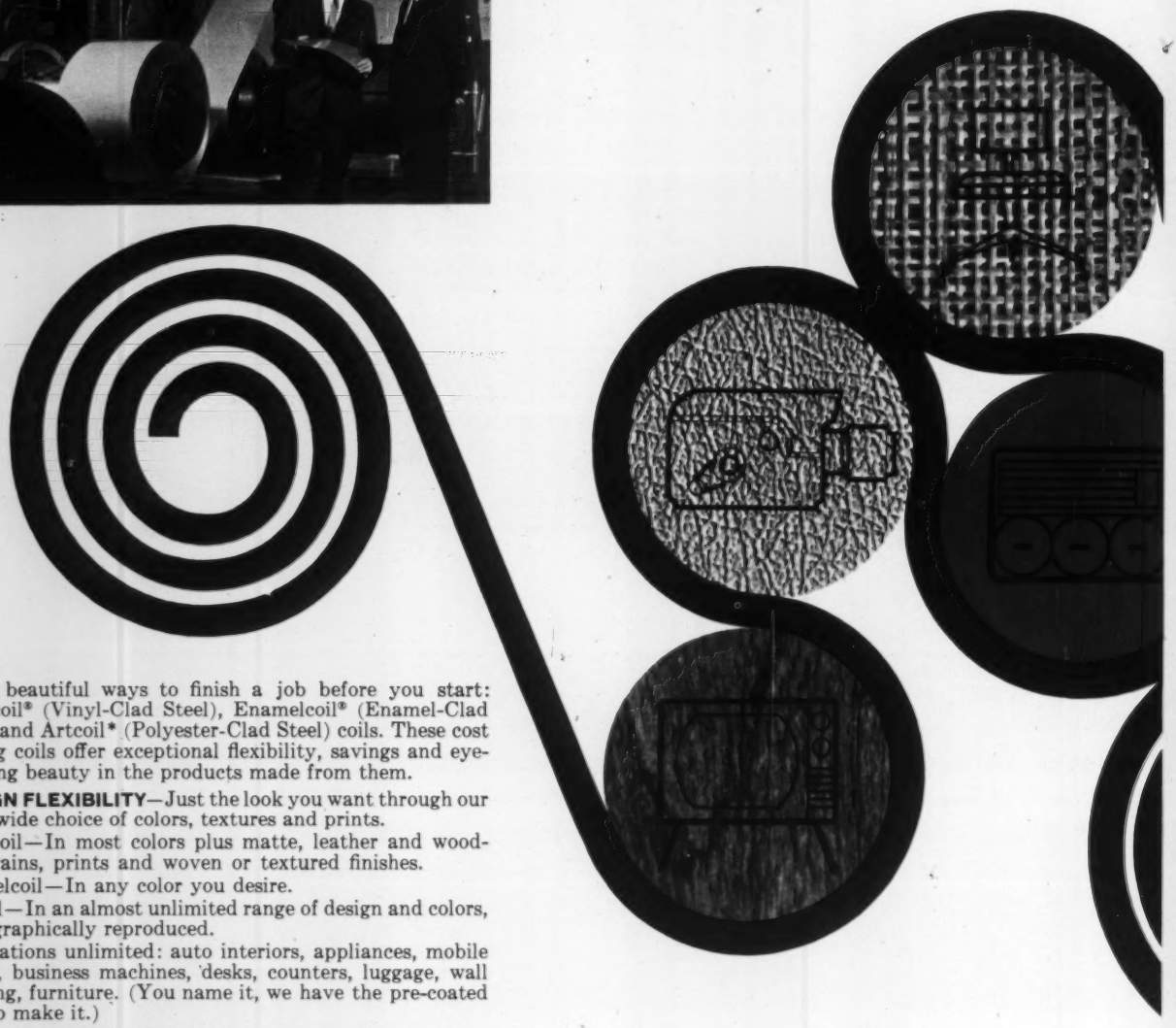

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An industrial truck operator's foot is a highly important part of his job. On a conventional truck, his right foot is busier than that of a pipe organ player, especially on tight maneuvering.

Hyster has perfected a control system that lets the driver move his truck forward or back, speed up or slow down, and the only control motion is a three-inch shift of his right toe!

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FATIGUE CRACKS

Covering the Capital

On almost any day in Washington, this young man can be seen hurrying to or from the buildings in the capital where news is made. He is Ralph Crosby, our Washington news editor.

Some of our desk-bound editors regard Ralph's job with envy. And so do we, to some extent. To even the most cynical newsman, Washington is a place of excitement, press conferences, events that make world news.

Hard Work, Too—But to those of us who have the responsibility of interpreting, reporting and editing the news, Washington is also a place of hard work and diligence.

This week, for the second consecutive week, Ralph is doing our lead news story. His report on the Arms buildup and its impact on metalworking, is also our cover story.

Vital Story—His reporting took him from the Capitol, to the White House, to the Pentagon, where he interviewed key people to nail down the real effects of the increased defense budget. This important story starts on p. 67.

Regular readers also noted his byline last week when he reported the Democratic senators' attack on what we call "phantom" steel price increases.

In addition to his news stories of major significance, Ralph writes our Washington column (Metalworking Newsfront 3), which appears each week on p. 11.

BUSY MAN: Washington Editor Ralph Crosby is kept on the go covering fast-breaking events in the nation's capital.

Space Age Swimmers

Astronauts are not the only missile age pioneers. Even the missile researchers and builders are a hardy breed.

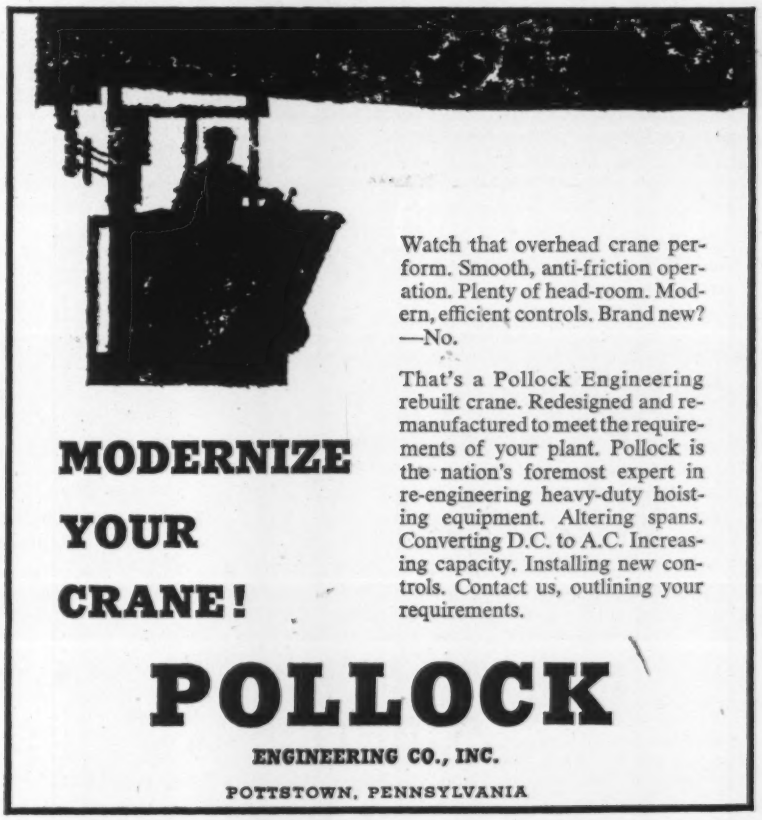
As proof our Chicago Regional Editor Keith Bennett supplies word on a grueling swim across Lake Michigan. Sponsored by a local auto dealer, it's a test of endurance won this year by Ted Erikson, a research staff member of the Armour Research Foundation, Illinois Institute of Technology.

At Armour he's project leader of a team developing high energy fuels for the Navy's liquid fuel missile program.

Background Helps—His chemical training came in handy on the swim. He developed a special liquid diet —corn and peanut oil—that supplied 500 calories an hour.

Mr. Erikson also trained himself to swim one mile an hour. Despite the fact he was bucking headwinds and waves up to six feet high, he swam 36.75 miles, spent 36.75 hours in the water. Actually he had to travel about 40 miles to complete the distance from Chicago to Michigan City, Ind., because of the wind and waves.

For his efforts he won $3675—apparently based on his mileage or time, or both.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Watch that overhead crane perform. Smooth, anti-friction operation. Plenty of head-room. Modern, efficient controls. Brand new? —No.
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AO Aluminized Clothing Reduces Fatigue, Increases Efficiency, Is Safer

Wherever high heat is a work hazard, lightweight AO Aluminized asbestos or rayon protective clothing is the best answer. It will help reduce workers' fatigue and boost their efficiency. The aluminum coating reflects 90% of all radiant heat, will not peel, has excellent abrasion resistance.

AO Aluminized asbestos is a herringbone weave, weighs only half as much as ordinary asbestos. It's more durable, more flexible, and more comfortable when worn for long periods. Small splashes of molten metal will not cling to it. They bounce right off the surface. To protect against heat alone, AO Aluminized rayon clothing gives you high radiant heat reflection but is much lighter in weight.

You can choose from a full line of AO clothing that has been designed to give maximum protection. Aluminized asbestos is recommended for high heat, sparks and metal splash. Aluminized rayon is best suited to jobs where heat does not require the insulating properties of asbestos. Contact your AO Safety Products Representative for complete details and prices.

Your Surest Protection . . . AO SURE-GUARD Clothing

American Optical COMPANY

SAFETY PRODUCTS DIVISION • SOUTHBRIDGE, MASSACHUSETTS

COMING EXHIBITS

Heavy - Duty Vehicle & Engineering Display—Sept. 11-14, Milwaukee Auditorium. (Society of Automotive Engineers, Inc.)

Instrument - Automation Exhibit—Sept. 11-15, Memorial Sports Arena, Los Angeles. (Instrument Society of America.)

Southeastern Plant Engineering & Maintenance Show — Sept. 12-14, War Memorial Coliseum, Greensboro, N. C.

Industrial Building Exposition—Sept. 25-28, New York Coliseum.

Fleet Maintenance Exposition—Oct. 23-26, New York Coliseum.

Metal Show — Oct. 23-27, Cobo Hall, Detroit. American Society for Metals.

Marine Supplies & Equipment Show—Nov. 15-17, Hotel Roosevelt, New York City.

MEETINGS

SEPTEMBER

Air Moving and Conditioning Assn., Inc. — Annual meeting, Sept. 10-14, The Greenbrier, White Sulphur Springs, W. Va. Assn. headquarters, Guardian Bldg., Detroit.

Society of Automotive Engineers, Inc.—"Heavy-Duty" vehicle meeting, Sept 11-14, Milwaukee Auditorium. Society headquarters, 485 Lexington Ave., New York 17.

Instrument Society of America—16th annual instrument-automation conference, Sept. 11-15, Biltmore Hotel, Los Angeles.

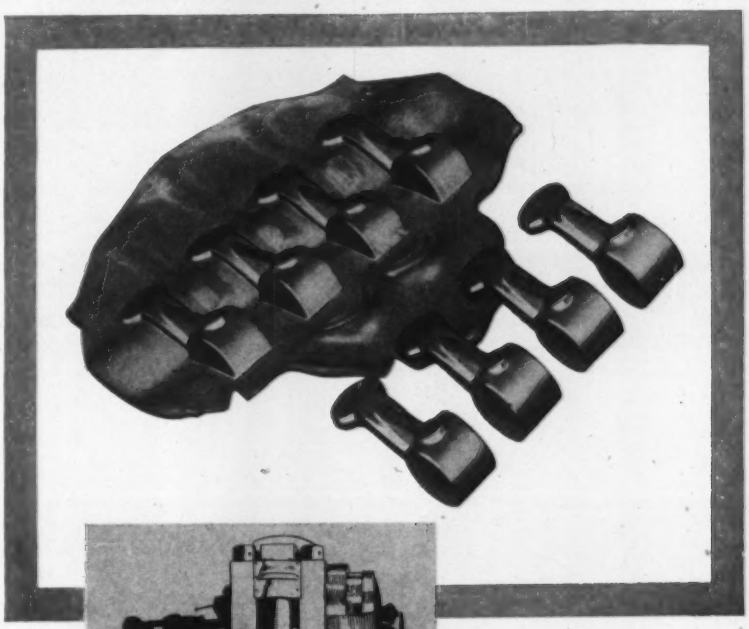
International Industrial Conference—Sept. 11-15, Masonic Memorial Auditorium, San Francisco.

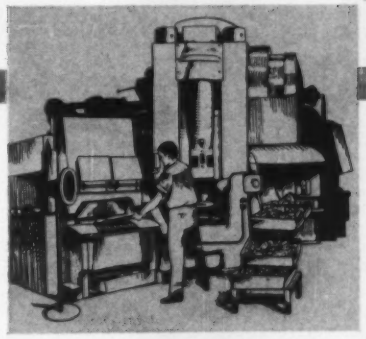
Society of Plastic Engineers, Inc.—Regional Technical Conference, Sept. 12, Central Indiana Section, Severin Hotel, Indianapolis.

Southeastern Plant Engineering & Maintenance Meeting—Third Southeastern meeting, Sept. 12-14, Town Hall, Greensboro, N. C.

(Continued on P. 30)

LOOK what brass is doing now!





Here's low cost for you!

This is 4-in-1 production of a Titan brass forging with high strength and consistent metal soundness. Close tolerances are maintained. There is less scrap waste. Costs are reduced.

And then you have the unparalleled machinability and natural finish of these brass forgings to take the finest polish or plating.

Like economies and advantages can be yours when you switch to Titan hot-pressed brass forgings. Let us help design and quote on *your* component parts.

Call your nearest Titan Man for detailed data and a brass forging quote. Titan forgings are made in Bellefonte, Pa., and Newark, Calif., for quick service and delivery.

Send for 32-page Titan Forging Handbook. Write us on your letterhead.

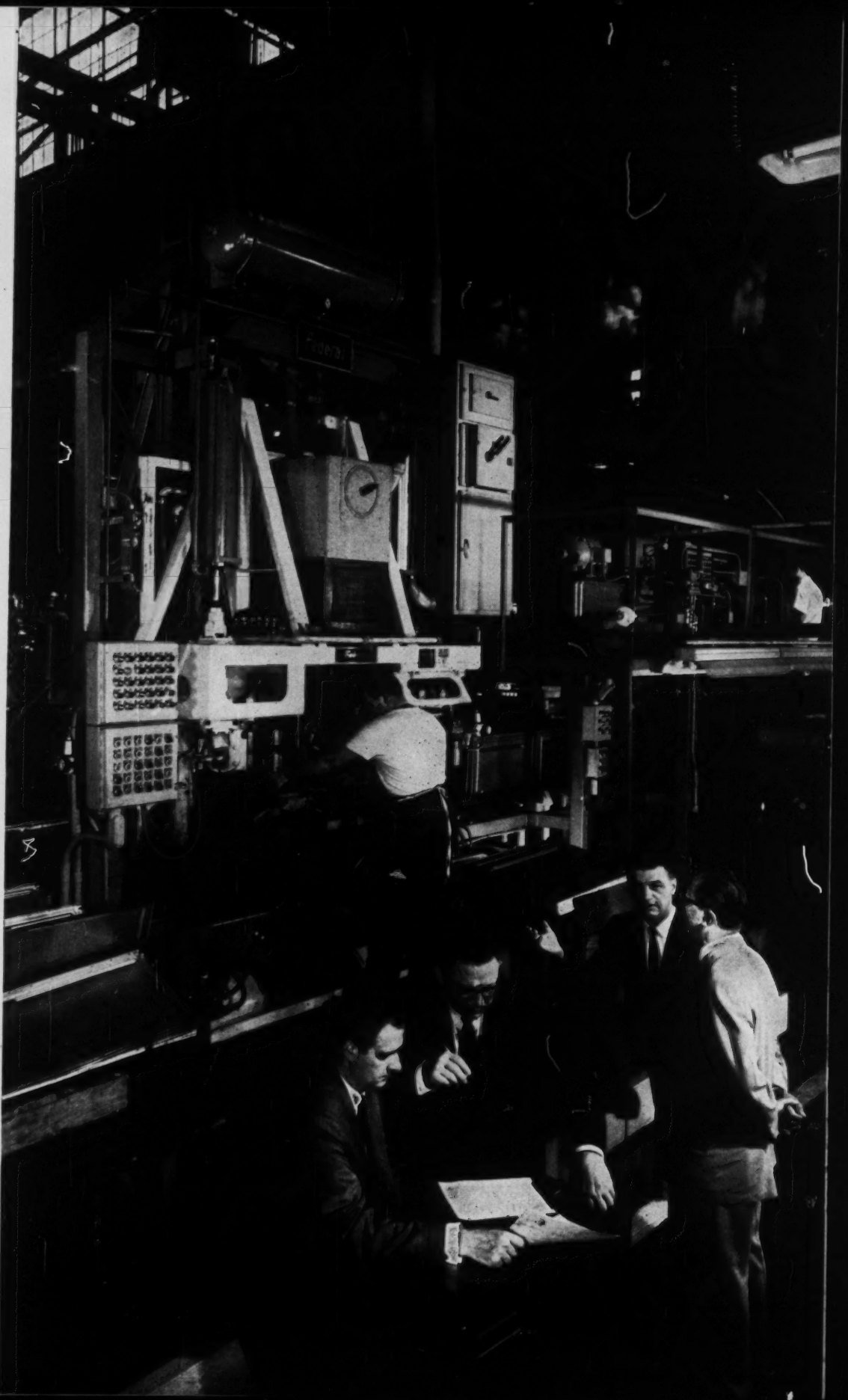
Established 1915

TITAN METAL MANUFACTURING COMPANY

DIVISION OF CERRO CORPORATION

Bellefonte, Pa. • Newark, Calif. • Offices & Agencies in Principal Cities

RODS • FORGINGS • DIE CASTINGS • WELDING RODS • WIRE



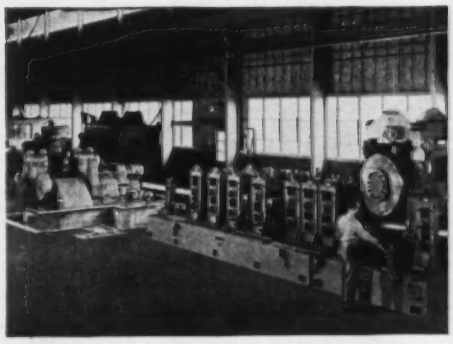
Federal Welding Line at Whirlpool's Evansville, Indiana, refrigerator plant automatically forms and welds together complete food liner shells at a rate of 200 per hour. Here, F. A. Bodenheim, Jr., manager of welder sales for McKay's Federal-Warco Division, goes over latest production charts with H. J. Muehlbauer, director of manufacturing engineering for Whirlpool, as Robert Bussell, sales representative for Federal-Warco, discusses operations with Gene Rommel, general superintendent of tooling for Whirlpool.

Photo by ARNOLD NEWMAN

A completely integrated plant . . . a single source of supply . . . one area of responsibility! A new idea? Not really, but an idea that's not easy to bring to reality. McKay Machine has done it for metal fabricators, designing and building equipment to volume produce parts or entire units from raw steel to finished product. ***This is McKay Machine*** We know steel handling . . . we've been designing uncoilers and coil-handling equipment for 30 years. McKay Machine knows welding because the highly respected names of Federal Welder and Berkeley-Davis are now a part of our company. We know processing and forming . . . McKay levelers, tube mills, and cold roll forming machines have been specified by leading industrial firms for more than two decades. And McKay Machine knows stamping, as the Warco Press name testifies. McKay builds the industry's most popular shearing and slitting equipment. Only McKay Machine designs and builds all the components for a truly integrated production line. If you are one of the hundreds of manufacturers who must shave production and handling costs to successfully compete, McKay Machine should interest you. If we do, let us know and we'll meet with you at your convenience.

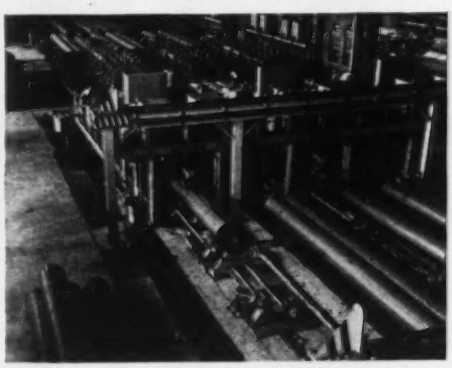
The McKay Machine Company, Youngstown 1, Ohio.

McKAY MCK MACHINE



McKay Tube Mills and roll forming machines are considered among the best engineered in the world.

Warco Presses can be found in the leading automotive, appliance and aircraft plants . . . wherever stamping is a major operation.

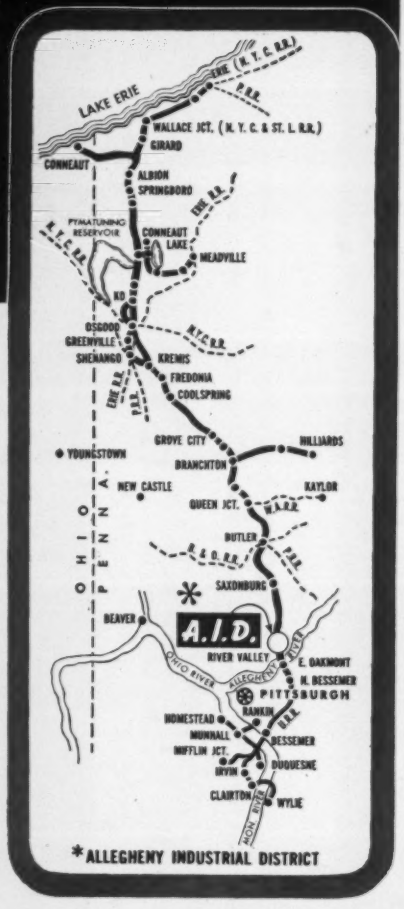


Berkeley-Davis Fusion Welding Lines, such as the huge installation above, are used by an ever-increasing number of leading steel fabricators.

Now is the *right time* to build your new plant or warehouse, and the *right place* is the 100 acres of prime land at the Allegheny Industrial District. Just 14 miles from downtown Pittsburgh, you get fast Bessemer freight and piggy-back service to the nation's principal markets via seven major trunk lines. There's quick access to major highways, too.

Other strategic advantages of an Allegheny Industrial District site are: 24-hour delivery of steel and other basic materials; an ample labor force with skills widely diversified; all utilities to meet any production or warehousing need; located at the center of America's No. 1 market area.

Investigate today! Write or phone for location factors. Complete confidence is assured.



BESSEMER and LAKE ERIE RAILROAD CO.

INDUSTRIAL DEVELOPMENT DEPARTMENT

1830 FRICK BUILDING • PITTSBURGH 30, PA. • ATLANTIC 1-4780

The Bessemer Man is at your "Site Service"

MEETINGS

(Continued from P. 27)

Non-Ferrous Founders Society — Annual meeting, Sept. 17-21, Shawnee Inn, Shawnee-on-the-Delaware, Pa. Society headquarters, University Bldg., 1604 Chicago Ave., Evanston, Ill.

AEC Welding Forum — Annual meeting (classified), Sept. 20-22, Southwest Research Institute. Institute headquarters, Granada Hotel, San Antonio, Texas.

Industrial Electronics Symposium —Sept. 21-22, Bradford Hotel, Boston. Institute headquarters, 51 East 42nd Street, New York 17.

Pressed Metal Institute — Annual meeting, Sept. 24-28, The Grand Hotel, Point Clear, Ala. Institute headquarters, 3673 Lee Rd., Cleveland.

American Welding Society — Fall meeting, Sept. 25-28, Adolphus Hotel, Dallas, Texas. Society headquarters, 33 W. 29th St., New York.

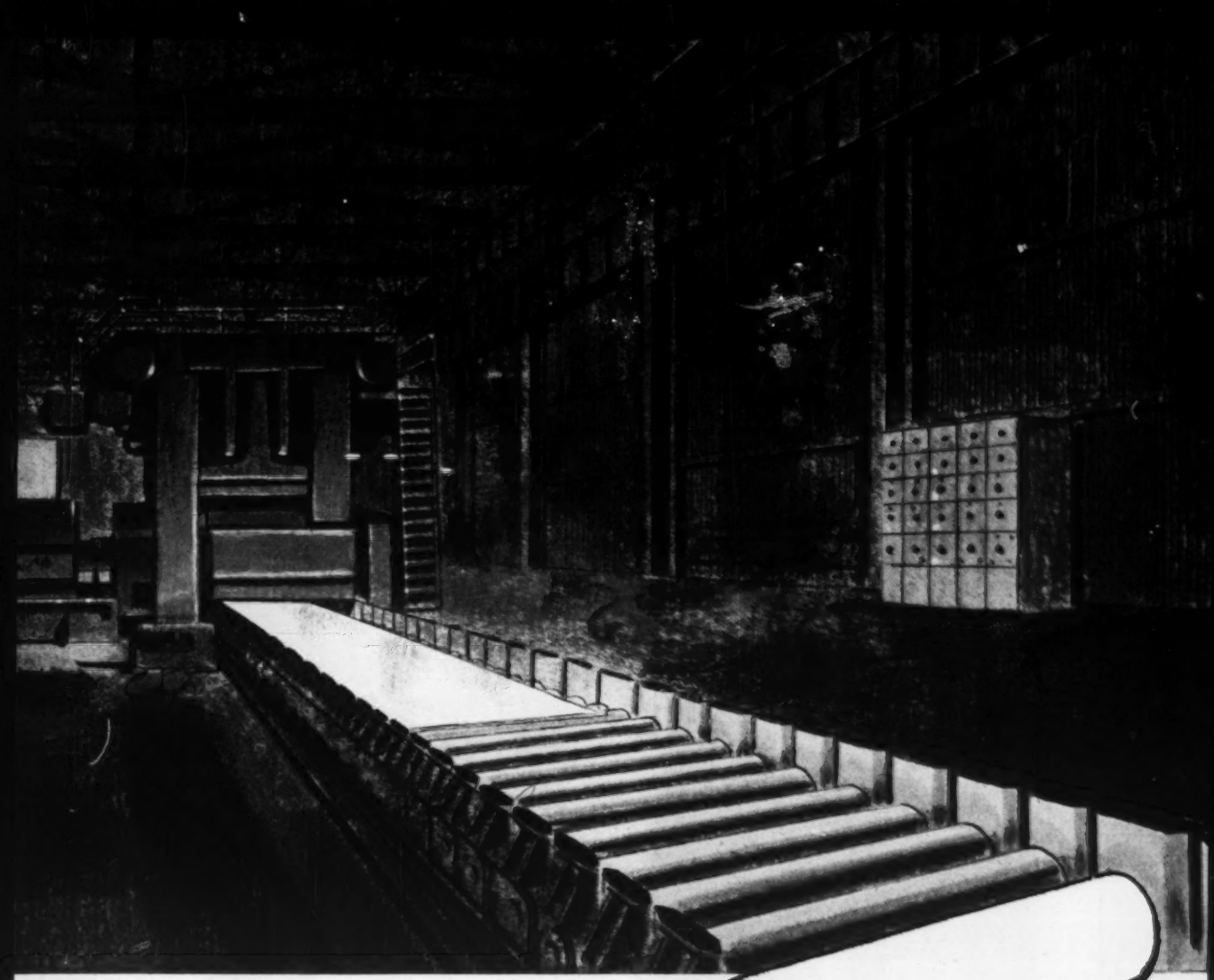
Assn. of Iron and Steel Engineers —Annual convention, Sept. 25-28, Penn - Sheraton Hotel, Pittsburgh. Assn. headquarters, 1010 Empire Bldg., Pittsburgh.

Steel Founders' Society of America —Annual meeting, Sept. 25-26, The Homestead, Hot Springs, Va.

American Die Casting Institute Inc. and The Die Casting Research Foundation—Annual meeting, Sept. 27 - 28, Edgewater Beach Hotel, Chicago. Institute headquarters, 366 Madison Ave., New York.

American Production and Inventory Control Society — Annual national conference and technical exhibit, Sept. 28-29, Pick-Congress Hotel, Chicago. Society headquarters, 330 S. Wells St., Chicago 6.

Purchasing Agents Assn. — 14th Pacific Inter-Mountain Conference, Sept. 29-30, Westward Ho Hotel, Phoenix, Arizona.



Rolls can take a beating when they are centrifugally cast by Shenango

Not only steel mill run-out table rolls as illustrated here, but glass making rolls, paper mill rolls, aluminum forming rolls and many others stand up longer and need to be redressed less frequently if they are centrifugally cast by Shenango. Ferrous or non-ferrous casting by spinning means cleaner, denser grain structure with no blow-holes or inclusions. And because Shenango operates one of the best staffed and most extensive modern centrifugal foundries and machine shops in the country, your largest orders will be filled with accuracy and dispatch.

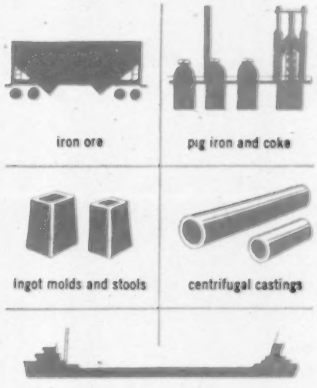
CENTRIFUGAL CASTING DIVISION

the Shenango FURNACE COMPANY

DOVER, OHIO

Copper, Tin, Lead, Zinc Bronzes • Aluminum and Manganese Bronzes • Monel Metal • Ni-Resist • Meehanite® Metal • Ductile Iron

THIS IS SHENANGO!



Custom Quality

OHIO COLD DRAWN

features improved physicals, closer tolerances, better finish

Arrows indicate approximate center of weld line. After normalizing, cold drawing and annealing, the weld area cannot be detected even when the polished and acid-etched surface is magnified 100 diameters. This perfect microstructure makes Ohio Drawn-Welded, in every sense, weldless — an ideal tubing for critical mechanical and pressure applications. In addition to cold drawing, a severe test in itself, non-destructive tests such as air, water, magnetic and eddy current, insure 100% acceptability.

A-4363A

WELDED STEEL TUBING

Now Available in Larger Sizes... Heavier Wall Thicknesses

NEWS ITEM:

Ohio Seamless is now cold drawing quality electric resistance welded steel tubing up to 7¼ inches with wall thicknesses to .344. Ohio Custom Made Drawn-Welded Tubing is here now — in greater range of sizes, wall thicknesses, finishes than ever before.

TECHNICAL ITEM:

Controlled normalizing assures desired microstructure . . . Precision cold drawing imparts special physical properties, assures uniform wall thickness, delivers closer dimensional tolerances and superior surface finish.

ACTION ITEM:

This all adds up to a new major-source capability that can help you design with new freedom, manufacture at lower costs. Mark your orders: Ohio Custom Made Tubing. Either welded or seamless, it's your best buy whenever tubing is the best shape.

STARTING POINT in making Ohio Drawn-Welded Tubing is a perfect Ohio electric resistance welded steel tube, carefully inspected and tested. Actual photographs of test control samples illustrate flare, crush and flattening tests performed continuously on every order for Ohio Tubing. Tubing must show no evidence of weakness to qualify for further processing into Ohio Drawn-Welded.

OHIO

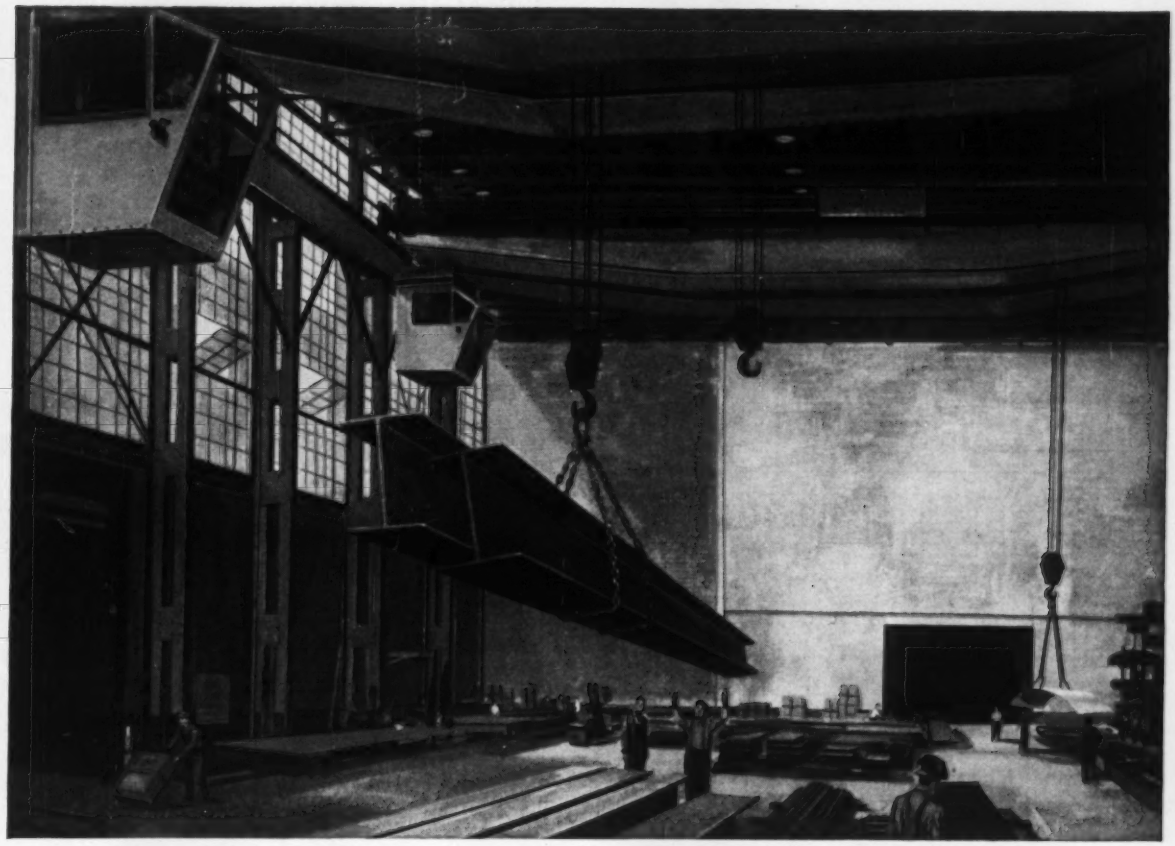
OHIO SEAMLESS TUBE

Division of Copperweld Steel Company • **SHELBY, OHIO**

Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging

Representatives in principal cities. Check leading directories:
THOMAS', MacRAE'S, CONOVER-MAST, SWEET'S, FRASER'S.

From the mills of FUJI emerge the materials for gigantic bridges and skyscrapers.
Quality is assured by century-old experience in integrated steelmaking.
OUR PRODUCTS:
Pig Iron, Billet Slab, Sheet Bar, Bar, Shape, Wire Rod, Rail, Hoop, Plate, Hot Rolled Sheet, Cold Rolled Sheet, Galvanized Sheet, Tin-plate, Panzermast, Light Gauge Steel.
FUJI IRON & STEEL CO., LTD.
Head Office: Nihonbashi, Tokyo Japan
Cable: STEELFUJI TOKYO
New York Office: 80 Pine Street New York 5, N.Y., U.S.A.
European Office: Graf-Adolf Str. 86/88 Duesseldorf Germany



TONS TO MOVE...SCHEDULES TO BEAT...BEARINGS MUST ROLL!

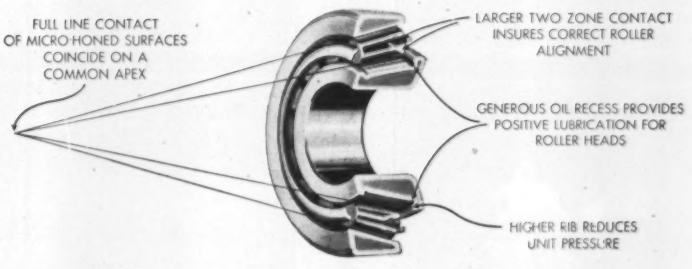
When the push is on, plant equipment must move at top speed. There's no time for machinery to act up, require excessive maintenance. That's why industry after industry relies on the bearing performance they've learned they can take for granted —Bower Roller Bearings for the heavy industrial machinery they make or operate. Bower-developed design advantages plus painstaking precision control reduce bearing failure and maintenance to an absolute minimum. What's more, the built-in durability of Bower bearings helps keep machinery operating at peak efficiency, even under the most rugged conditions. For *your* bearing requirements—for new equipment or for replacement—choose from Bower's complete line of tapered, cylindrical or journal roller bearings. Bower Roller Bearing Division, Detroit 14, Michigan.

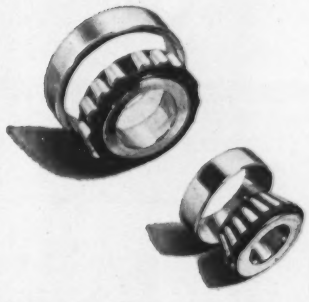
BOWER ROLLER BEARINGS

tapered
cylindrical
journal

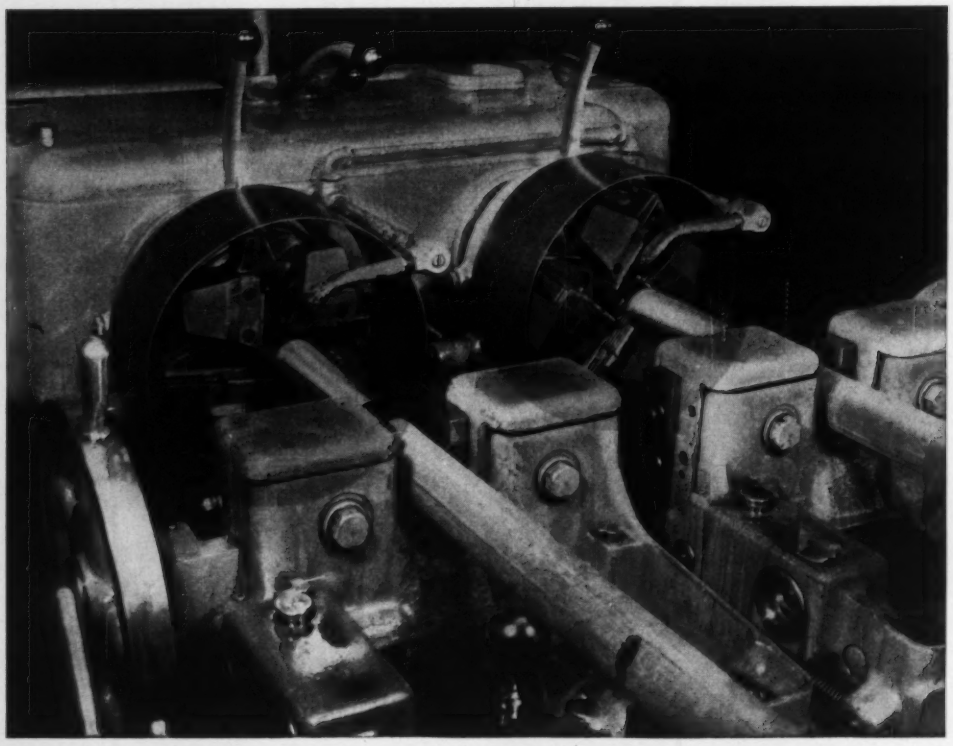
DIVISION OF
FEDERAL-MOGUL-BOWER
BEARINGS, INC.

IMPROVED DESIGN INSURES TOP ROLLER BEARING PERFORMANCE


FULL LINE CONTACT OF MICRO-HONED SURFACES COINCIDE ON A COMMON APEX
LARGER TWO ZONE CONTACT INSURES CORRECT ROLLER ALIGNMENT
GENEROUS OIL RECESS PROVIDES POSITIVE LUBRICATION FOR ROLLER HEADS
HIGHER RIB REDUCES UNIT PRESSURE



One pass heavy duty threading with LANDMACO MACHINE



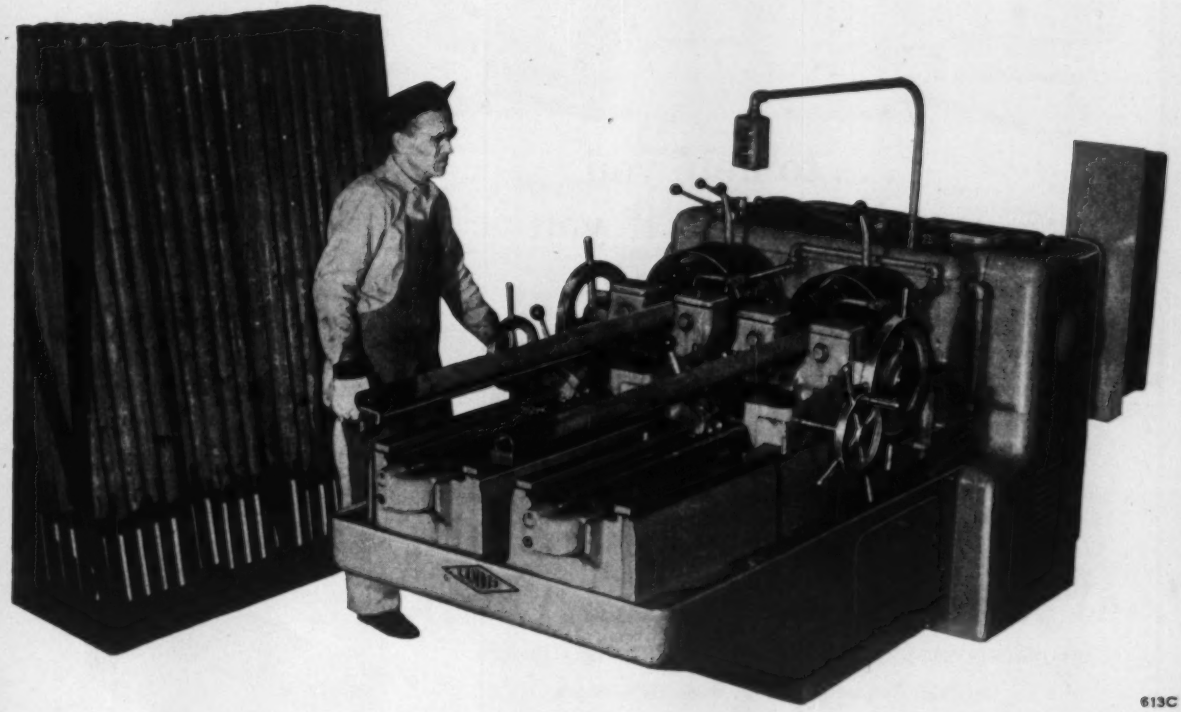
LANDMACO Threading Machines prove daily to be ideal for cutting coarse pitch threads in one pass. We illustrate here the excellent results obtained by using a 2½" 20C LANDMACO Double Spindle Threading Machine at WACO Manufacturing, Cleveland, Ohio.

Equipped with a 2½" Type R LANCO Heat Treated Die Head, the LANDMACO cuts 2⅜", 4 Pitch Modified Acme threads on Black Pipe 8½" long at a cutting speed of 34 R.P.M. 31 pieces are threaded per hour per each spindle. Despite the large amount of metal removal, chaser life is good with 248 pieces produced between grinds for each spindle, equal to 8 hours operation.

LANDMACO machines are especially suited for the cutting of Acme threads. The 2½" LANDMACO features heavy construction, hardened-and-ground ways and lead screw attachment. Although equipped with a Heat-Treated Head in the WACO application, the LANDMACO may be used with Hardened-and-Ground LANCO Die Heads. This Machine's diametrical range is ½" to 2½" with other LANDMACO models available to cover all ranges from ¼" to 6⅝". For more detailed information please send specifications when writing.

LANDIS Machine COMPANY WAYNESBORO • PENNSYLVANIA

THE WORLD'S LARGEST MANUFACTURER OF THREADING EQUIPMENT



613C

a quick quiz

. . . to help you determine if you are getting the most for your metal finishing dollar.

Check your answers to these three important supplier questions. Then, compare what you get when you buy from Allied Research Products, Inc.

PRODUCT VALUE

Do I get the results I want at the lowest possible cost?

Always ☐
Sometimes ☐
Seldom ☐

Whether you want quality or economy . . . there's an Allied Research product designed to give you the best finish for the money. Specify your chemicals, equipment, or supplies for better finishing from this list:

IRIDITE ®
conversion coatings
for non-ferrous metals

IRILAC ®
protective coatings
for all metals

ISOBRITE ®
plating brighteners

ARP ®
process chemicals

WAGNER
electroplating equipment

Other standard plating room chemicals and supplies.

SERVICE

Can I get the kind of service I want — where I want it — when I want it?

Always ☐
Sometimes ☐
Seldom ☐

Allied provides a nation wide network of sales engineers and warehouses — service men and laboratories. Prompt product delivery or expert help is as close as your telephone. Check us out on promptness. Call your Allied Research man. Or, write direct if you'd like information on:

Chemicals

Equipment

Supplies

KNOW HOW

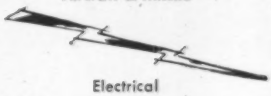
Does my supplier know my industry's finishing requirements?

Always ☐
Sometimes ☐
Seldom ☐

Allied has years of experience helping customers establish quality finishing standards. The performance of many Allied products has helped set quality levels for industry and government specifications in these industries.

Military

Aircraft & Missile


Electrical

Automotive

Appliance

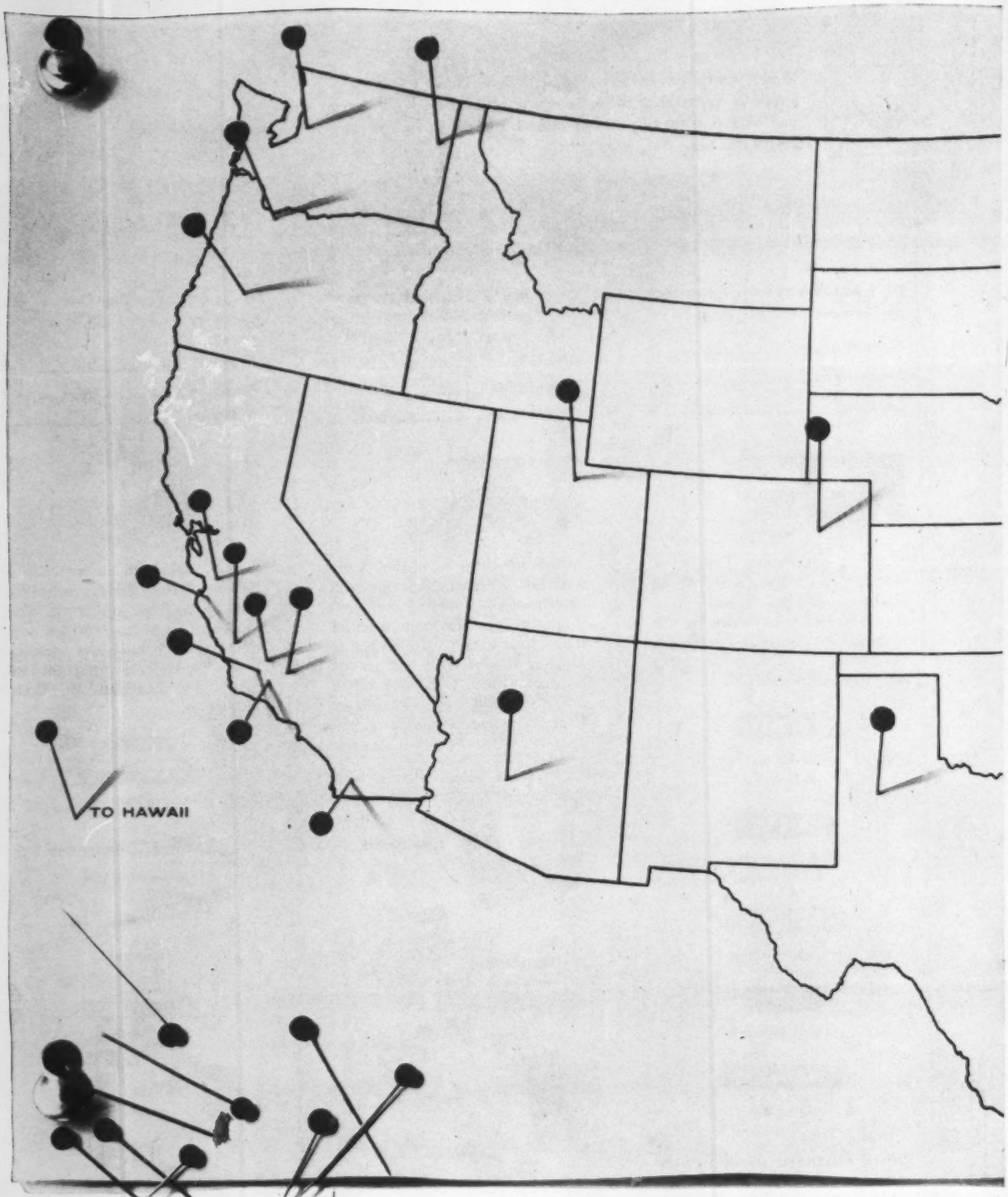
Hardware

Like to have a free Value Analysis of your metal finishing operations? Write direct or call your Allied Field Representative. He's listed in the Yellow Pages under "Plating Supplies".

Allied Research Products, Inc.

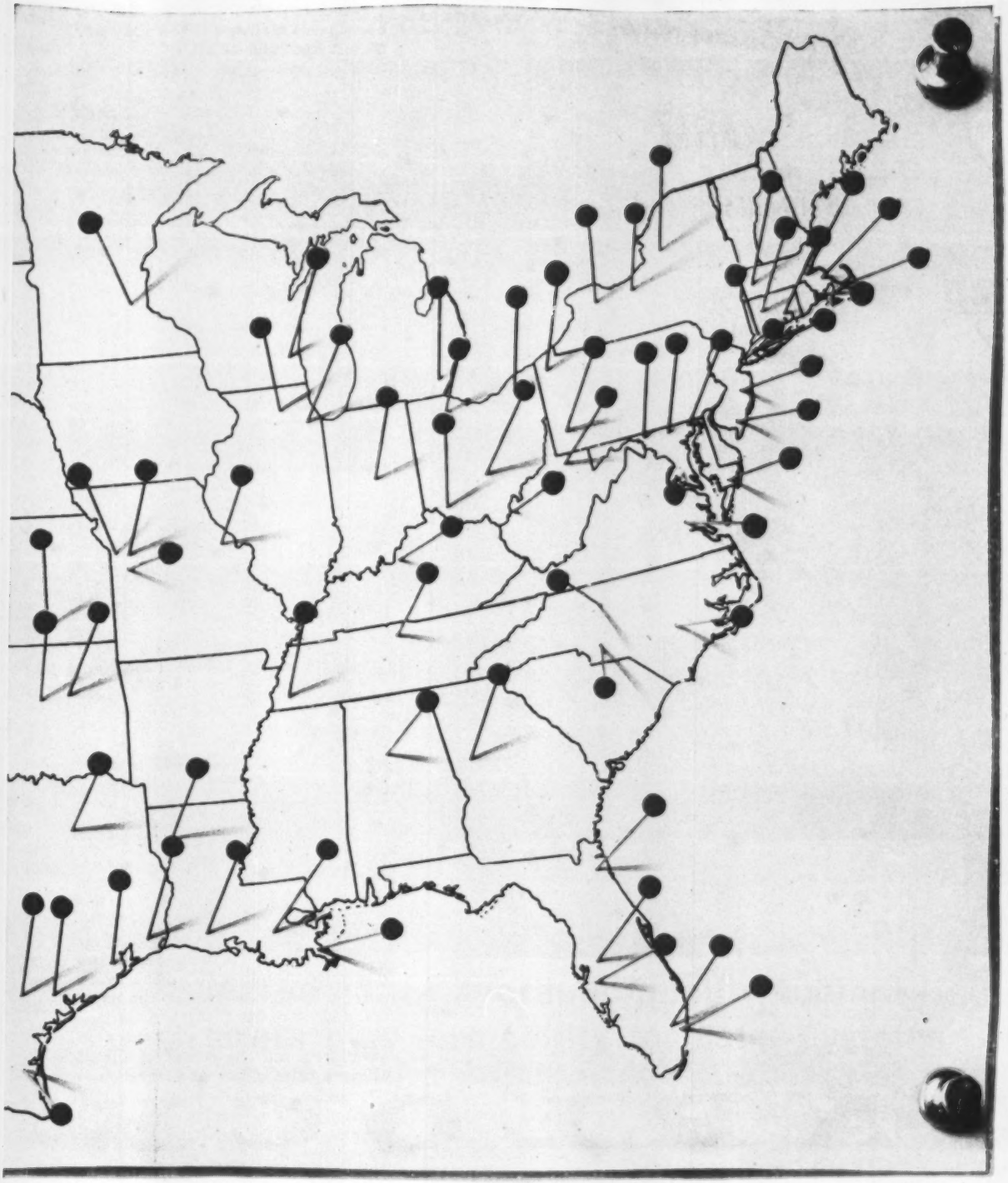
4004-06 EAST MONUMENT STREET • BALTIMORE 5, MARYLAND

Affiliated operations in principal countries



Pin-pointed supply

Wherever you are, Eastern Stainless Steel is close by. Whatever you may need to meet your schedules, it will be sped to you from one of Eastern's supply centers in 83 cities. Whenever you need stainless sheet, plate, coil or strip, Eastern will see that you get it. Phone, teletype or visit Eastern Stainless where your delivery dates are our chief concern; your satisfaction, our chief aim.



FREE BOOKLET—Full color, 16 pages. Useful data on stainless steel . . . types, size range for converted plates, Sendzimir and handmill limitations, finishes available, etc. Send coupon now for your free copy.

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BALTIMORE 3, MARYLAND

Eastern Stainless Steel
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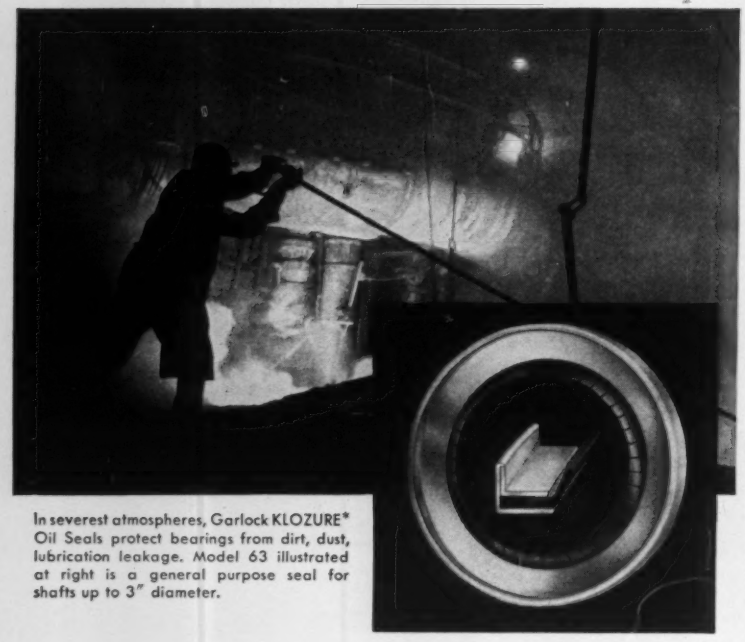
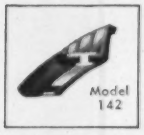
ENGINEERED OIL SEALS
for Steel Mills



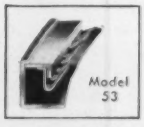
In severest atmospheres, Garlock KLOZURE* Oil Seals protect bearings from dirt, dust, lubrication leakage. Model 63 illustrated at right is a general purpose seal for shafts up to 3" diameter.

Where there is the slightest possibility of bearing damage due to oil leakage, apply Garlock KLOZURE Oil Seals.

Everywhere in steel—on hot and cold strip mills, blooming and structural mills—Garlock KLOZURE Oil Seals prevent leakage of vital bearing lubrication. And they further prevent damage to the bearings by sealing out scale, spray, dirt, and other foreign matter.



For example, Model 142, a face-type oil seal, is designed to seal surfaces perpendicular to shaft . . . keeps water splash and scale out of bearings at the shoulder of mill rolls. Models 64 and 82 are applied to large shafts at normal or high speeds . . . ideal for protecting bearings on back-up and work rolls. Model 53 withstands temperatures up to 250°F at normal or high speeds . . . recommended for table rolls. Where equipment can't be dismantled easily, Model 23 Split-KLOZURES are the choice.



All KLOZURE Oil Seals are oil and grease resistant . . . impervious to water, mild acids, alkalies . . . non-abrasive . . . withstand temperatures from −40°F to +250°F. For extreme conditions, Garlock furnishes sealing elements resistant to practically any fluid, and serviceable as high as +500°F.

Enjoy prompt "off-the-shelf" delivery. A new, nationwide stocking program places over 1800 standard stock items of Garlock KLOZURE Oil Seals near you. All you need is a telephone for quick service on a badly-needed replacement oil seal, or to replenish your current stock of seals. For the name and address of the authorized Garlock KLOZURE Oil Seal distributor in your area, call the closest of the 26 Garlock sales offices and warehouses throughout the U.S. and Canada. Or, for further oil seal data, write for Catalog AD-181, Garlock Inc., Palmyra, N.Y.

GARLOCK

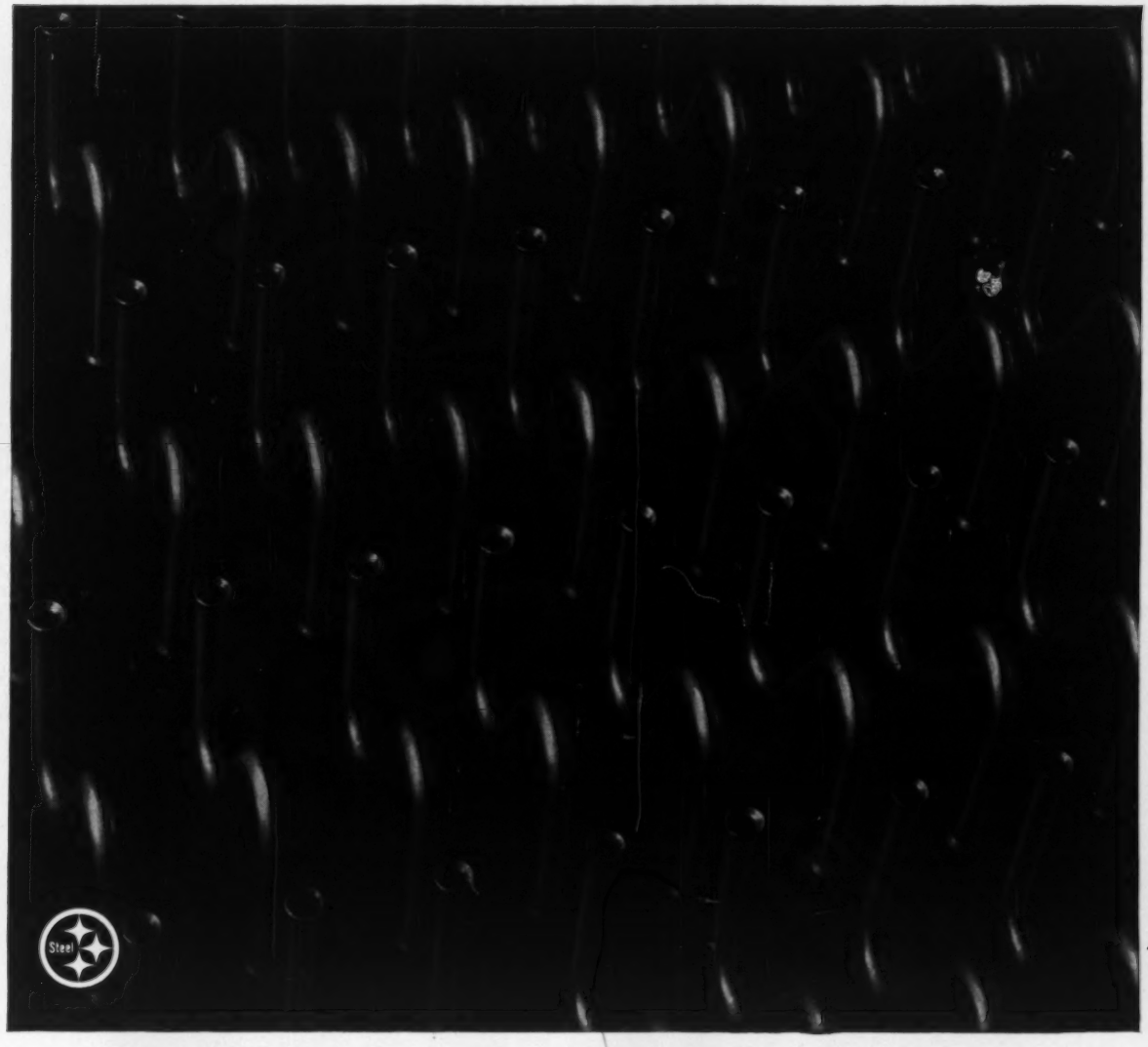
Canadian Div.: Garlock of Canada Ltd.

Plastics Div.: United States Gasket Company

Order from the Garlock 2,000 . . . two thousand different styles of Packings, Gaskets, Seals, Molded and Extruded Rubber, Plastic Products.

*Registered Trademark

Tomorrow's tubing technology—today



Superior (SAE) hydraulic quality tubing—strength plus formability for safer systems

There are many reasons why Superior (SAE) hydraulic quality tubing is specified for application in hydraulic systems operating under pressures up to 3000 psi. It has an ultimate tensile strength of 60,000 psi max., a yield strength of 25/45,000 psi, and an elongation of 35/45% in 2 in. It has a recommended maximum working pressure range of 530 to 11,750 psi, depending on OD and wall thickness. Every length is hydrostatically tested under maximum working pressure. It is made of non-aging steel, maximum carbon content 0.12%. It is specially coated with a waxlike rust preventive.

Superior (SAE) hydraulic quality tubing has other important advantages too. It can be easily bent into angle turns or sweep bends—pipe fittings, which are subject to leakage, are eliminated. It does not require threading, which removes metal and weakens the wall. It absorbs vibration by reducing the number of fittings needed and by providing the required strength with minimum wall thickness. It has a bright, smooth, scalefree interior to minimize turbulence and pressure drop.

No matter what your small-diameter tubing requirements are, we can satisfy them. In addition to (SAE) hydraulic quality tubing, we offer more than 120 analyses in quantities from 50 to 1,000,000 ft. Sizes range from .010 in. to ⅞ in. OD. Bulletin 39 gives complete details about Superior (SAE) hydraulic quality tubing—write for a copy today. Superior Tube Company, 2004 Germantown Ave., Norristown, Pa.

Superior Tube

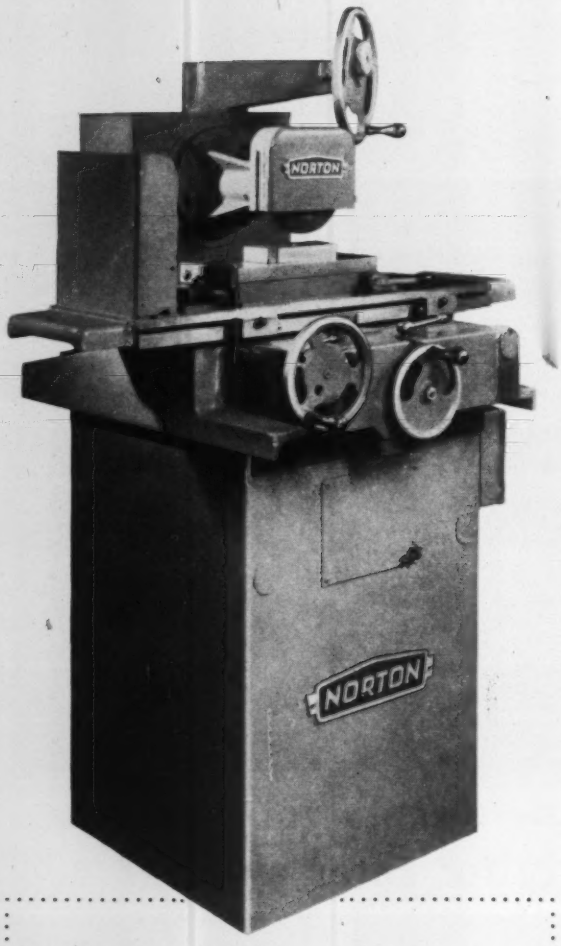
The big name in small tubing

NORRISTOWN, PA.

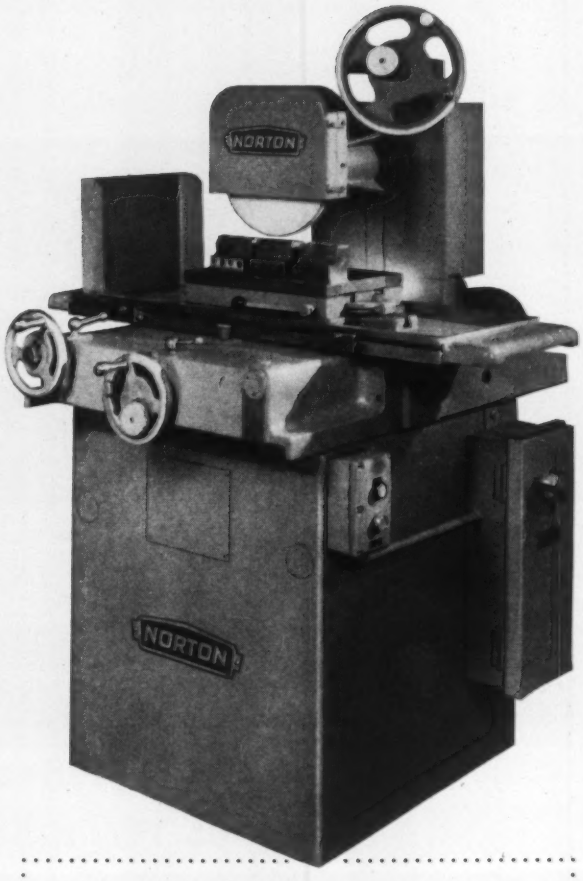
West Coast: Pacific Tube Company, Los Angeles, California

Announcing

New Norton Hand



NORTON 6 x 12" Type TS Hand Surface Grinder Table travel up to 14". Cross traverse up to 7". Maximum height capacity 12½"*. Grinding wheel, 7" x ¾" x 1¼". Table traverse by hand through positive cable drive. One revolution of hand wheel moves table 6⅝", on friction-free ways.



NORTON 10 x 16" Type TS Hand Surface Grinder Table travel up to 18", cross traverse to 11", grinding wheel 12" dia. Extended wheel head ways assure maximum grinding support and full use of 12" vertical* capacity. Two-speed wheel drive. Fine cross-feed increments of .0005".

*Table top to bottom of full size grinding wheel.

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Non-Slip Floors — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

Surface Grinders....

Latest Norton developments...
simplified, rugged, versatile...
are welcome cost-cutters
for your daily toolroom jobs.

Like all Norton grinders — from highly complicated automatic production machines to simpler toolroom types — the new TS Type Hand Surface Grinders have the common denominator of *precision performance*, *easy operation* and *long service life*, built into them as follows:

Precision Performance. Two-speed wheel feed hand wheel has graduations of .0005″ for fast, accurate positioning, plus a vernier scale graduated .0001″ for precise grinding feeds. Rigid and long vertical slide and saddle design provide maximum support for moving parts, resulting in reduced vibration and better finish. Accuracy of center-guide cross feed is excellent for groove and shoulder grinding.

Easy Operation. Controls are at working height, for fatigue-free table and cross feed operation. Antifriction bearings under the table produce a smooth and easy motion for reduced effort. Table and cross slide controlled by hand wheels with no levers requiring crossed-arm operation when motions are simultaneous. These grinders are the only machines of their type with hinged wheel guard for quick wheel change.

Long Life. Anti-friction spindle is mounted in housing for rigid, rugged strength. Long vertical slide ways eliminate wheel "hang up" tendencies and provide large way areas. Deep saddle eliminates rocking, gives strong support for grind. Antifriction rollers cut wear on table and cross slide.

Over-all economy of NORTON TS Hand Surface Grinders is strengthened by many features such as their uncomplicated, accessible mechanisms and clean, uncluttered design which reduce maintenance costs. For details on how these new NORTON developments can cut your own daily grinding costs, see your Norton Man, a Trained Grinding Engineer. Or write to NORTON COMPANY, Machine Tool Division, Worcester 6, Mass. *District Offices:* Worcester, Hartford, Chicago, Detroit, Cleveland.

In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5.

NORTON
MACHINE TOOLS

75 years of . . . Making better products . . . to make your products better

MACHINE TOOL DIVISION: Grinding and Lapping Machines — G & E DIVISION: Shapers • Gear Cutting Machines • Gear Induction Hardeners

Why do we say fulfills the promise

For single function or automated system... our Systemation concept is fitted to your actual needs

In crude definition, automation merely means "to make automatic." In implication, however, automation carries strong promise of low-cost production. It is in the area of lowering costs, some feel, that automation has most frequently missed its potential.

The engineering genius which can concoct sophisticated circuitry . . . join computers, primary detectors, instruments, processing equipment . . . too frequently overlooks the fundamentals of thorough *process knowledge* and such basic problems as the maintenance costs associated with automated systems.

Prudent investment of key importance

The *Systemation* concept is built around lowering *your* processing costs, increasing *your* productivity, improving *your* quality control. The starting point is not "what can be automated" but rather "what automation can be economically justified under your conditions of production."

Allis-Chalmers is thoroughly qualified to help you make *prudent* investment decisions about equipment and instrumentation.

Balanced judgment in depth

Long a supplier of control systems, a broad line of industrial processing and electrical generation, transmission, distribution and utilization equipment, A-C has an intimate knowledge of industrial processes. With the acquisition of Consolidated Systems Corporation last year, Allis-Chalmers extended its ability in the areas of data gathering, handling and utilization. CSC provides such experience acquired from more than 500 successful system projects.

Recently, Allis-Chalmers, Consolidated Systems and International Business Machines Corporation effected a nonexclusive mutual agreement relating to the production and marketing of automated control systems and processes.

For the typical system, Allis-Chalmers takes functional responsibility for the system using IBM data processing computer equipment, CSC specially engineered data conditioning equipment and instrumentation, and A-C basic and auxiliary industrial processing equipment. Now, Allis-Chalmers brings a balance of specialized judgments to bear on your problems . . . drawn on significant experience . . . to make major "contributions to the art" in many phases of *Systemation* and help you be sure before you invest.

Feasibility study shows opportunity

Your first step to Systemation *is a thorough feasibility study which spells out your opportunities for savings and puts a clear figure on the costs. Call or wire your nearest A-C office, or the Industrial Equipment Division, Allis-Chalmers, Milwaukee 1, Wis.*

Systemation is an Allis-Chalmers servicemark.

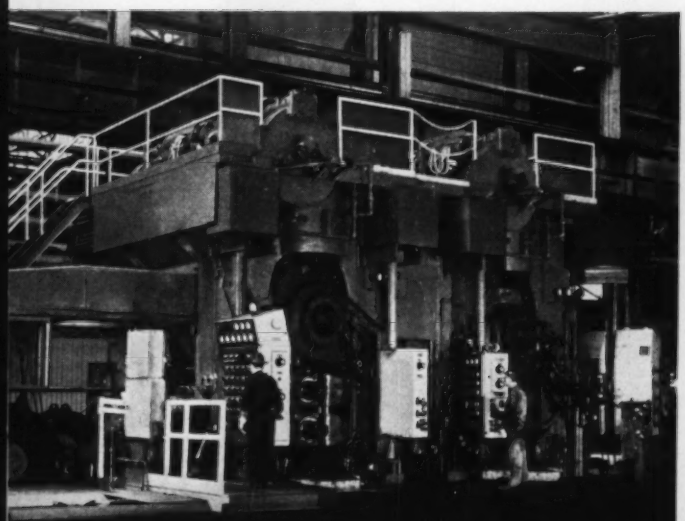
Systemation*

pays its way

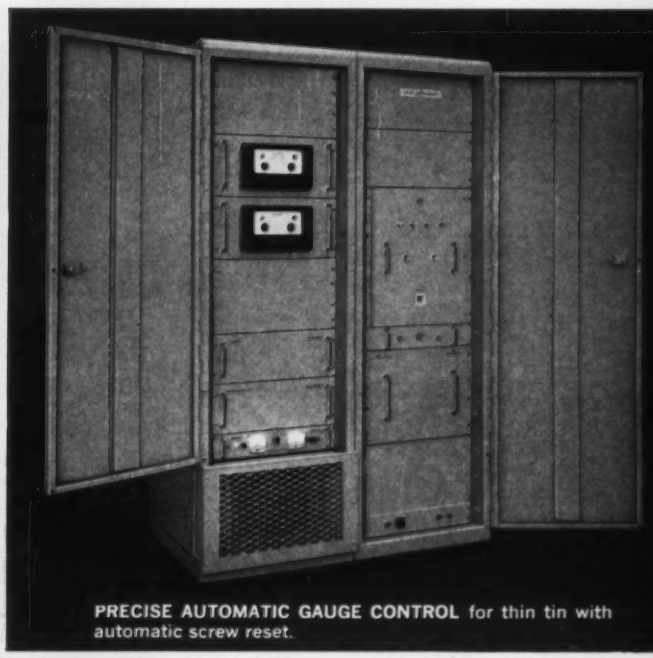
ALLIS-CHALMERS

A-1531

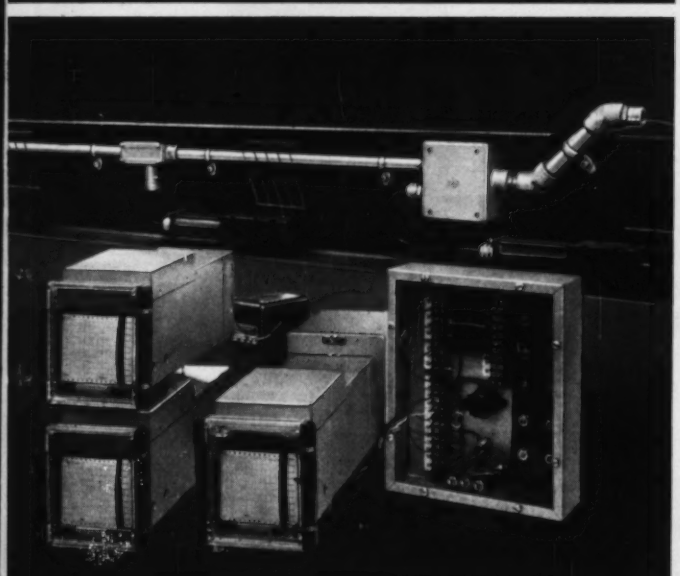
Systemation of automation?



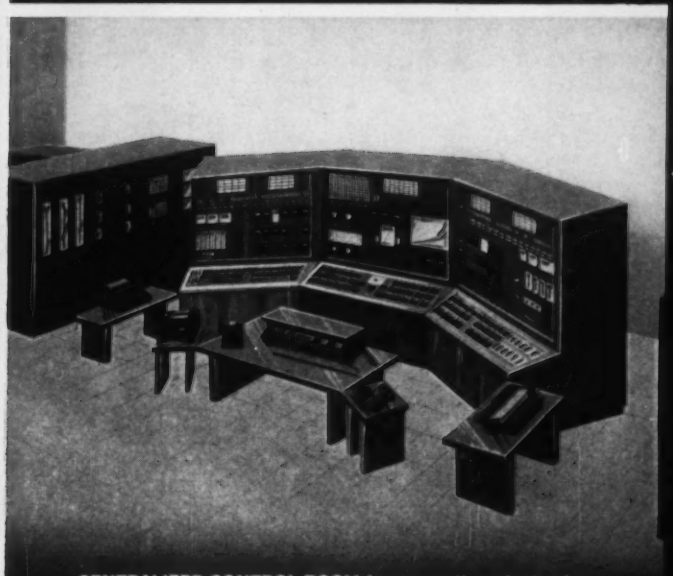
HIGH SPEED TEMPER MILL features include: automatic digital extensiometer to indicate strip extension (hardness pickup); automatic slowdown for rolling maximum length at rolling speed, yet prevent mandrel explosion or tail-end roll damage.



PRECISE AUTOMATIC GAUGE CONTROL for thin tin with automatic screw reset.



AUTOMATIC BED DEPTH CONTROL for traveling grate in GRATE-KILN iron ore pelletizing process.

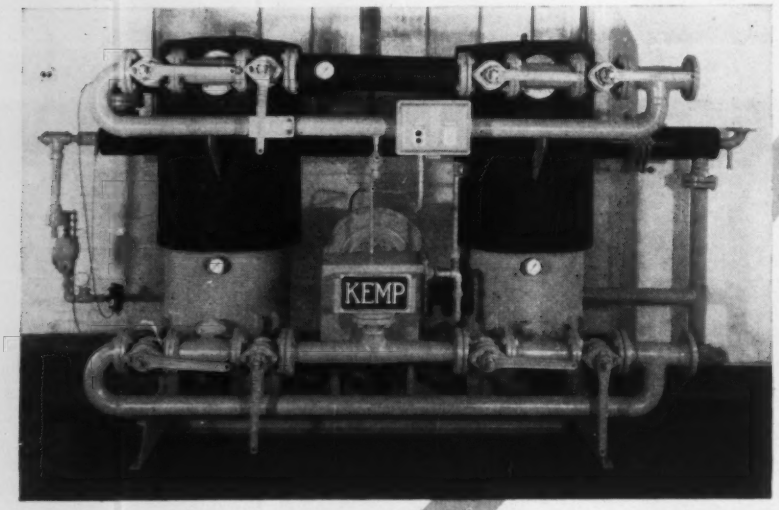


CENTRALIZED CONTROL ROOM for generating plant using one computer to automatically control two units for start-up, operation and shutdown.

For precise control of metal-working atmospheres (drying Nitrogen, Hydrogen and annealing gases to –60° F. dewpoints)

...KEMP CONVECTION DRYERS

cut down-time, up production-time 4 ways!



1 Full Reactivation . . . assures unmatched drying power for air, gases or liquids. Exclusive external design allows complete reactivation unaffected by variations in flow rate or dry gas needs.

2 Low Pressure Loss . . . is another Kemp Convection Dryer cost-saving feature. Unique full-flow design of drying towers and connections assures the least pressure loss, lower operating cost.

3 Automatic Control . . . is achieved once you pre-set the program timer. The reactivation cycle of heating and cooling then becomes automatic. All Kemp Dryers are easily switched to manual control, too.

4 Safety-proved Operation . . . is a fact with any Kemp Dryer. Check and relief valves, an alarm circuit . . . all protect the entire system. Write for Bulletin D-106 for further details . . . or contact your local Kemp Representative.

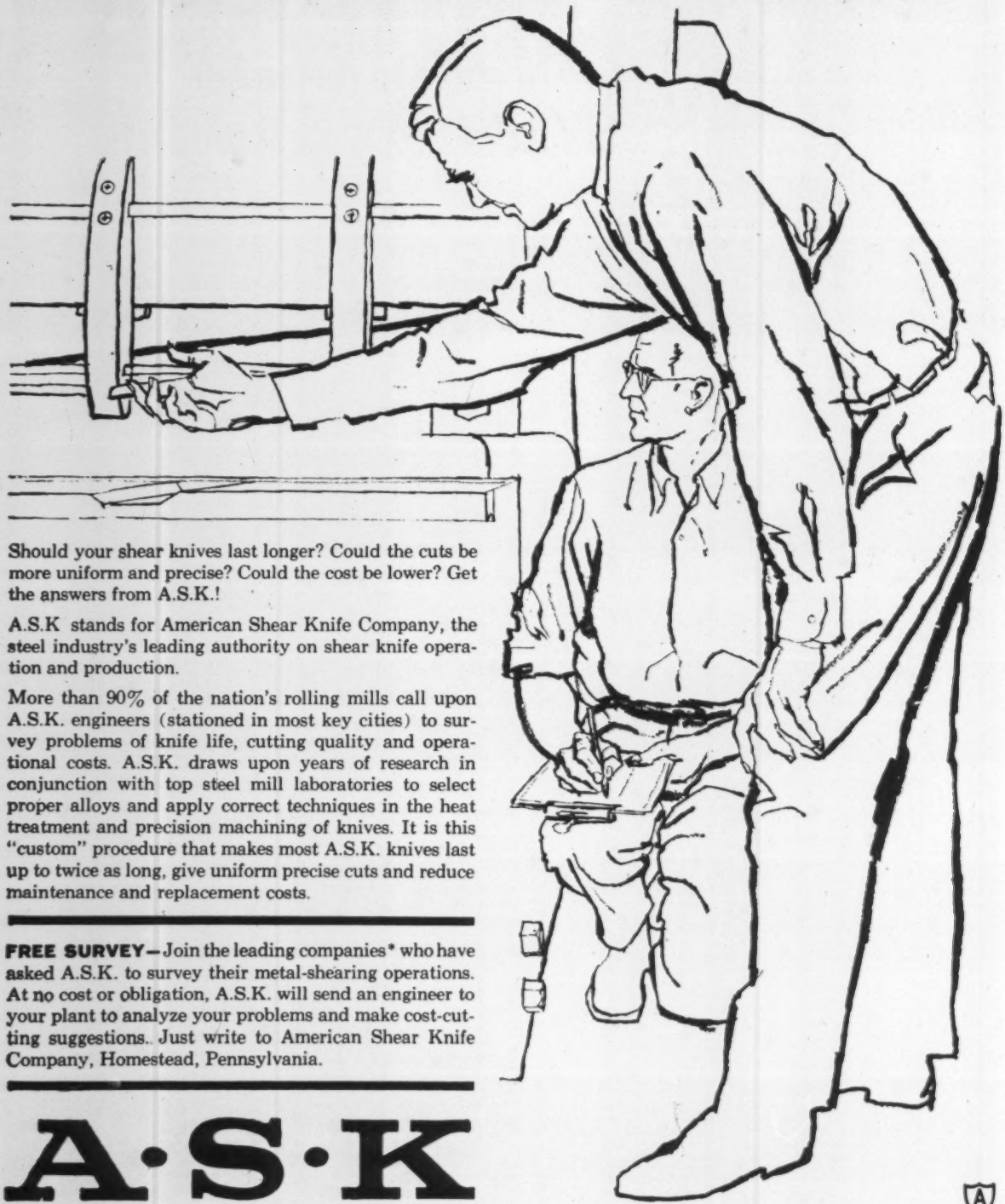
It always pays to come to **KEMP OF BALTIMORE**

THE C. M. KEMP MANUFACTURING COMPANY
405 E. Oliver St., Baltimore 2, Md.

HITACHI
a name to remember
in special iron & steel products
The demands of modern living are nowhere more dramatically reflected than in the increasing demand for iron and steel products, and we are proud to be helping to meet that need. Our products include malleable pipe fittings and iron castings; ductile cast iron for use in crankshafts, camshafts, sprocket wheels, etc.; cast iron and steel parts for rolling stock, automobiles and rolling mills; forged steel parts for industrial machinery (rotor shafts, thrust shafts, counter shafts, axles, gears, rollers, etc.); machine tool steels, high speed steels, stainless and other special steels. We are the largest manufacturers in Japan and have exported the above products all over the world.
Hitachi, Ltd.
Tokyo Japan
Cable Address: "HITACHY" TOKYO

Can you get more wear from your shear knives?

A·S·K for the answer!



Should your shear knives last longer? Could the cuts be more uniform and precise? Could the cost be lower? Get the answers from A.S.K.!

A.S.K stands for American Shear Knife Company, the steel industry's leading authority on shear knife operation and production.

More than 90% of the nation's rolling mills call upon A.S.K. engineers (stationed in most key cities) to survey problems of knife life, cutting quality and operational costs. A.S.K. draws upon years of research in conjunction with top steel mill laboratories to select proper alloys and apply correct techniques in the heat treatment and precision machining of knives. It is this "custom" procedure that makes most A.S.K. knives last up to twice as long, give uniform precise cuts and reduce maintenance and replacement costs.

FREE SURVEY—Join the leading companies* who have asked A.S.K. to survey their metal-shearing operations. At no cost or obligation, A.S.K. will send an engineer to your plant to analyze your problems and make cost-cutting suggestions. Just write to American Shear Knife Company, Homestead, Pennsylvania.

A·S·K

AMERICAN SHEAR KNIFE

**names supplied on request*

Another vital new concept in chemical pre-paint treatment by AMCHEM!
ROLL COAT APPLICATION OF ALODINE* FOR PRE-TREATING ALUMINUM!

Now, Amchem further widens pre-paint treatment flexibility! First there was spray application, then dip, then spray-dip — all exclusive Amchem developments. And today, Amchem announces *roll coat application* of chromate coatings, providing still more features and economies in treating aluminum!

Roll coating with Alodine offers greater flexibility in processing and in speed, in cost reductions for maintenance. Equipment required is minimized. Uniformity of coating is equal to or better than existing methods. Advanced equipment design and increased chemical activity of Alodine 1200 Series chemicals make roll coating possible. It is the most practical and efficient pre-treating process yet available for aluminum fabricators.

Get the full details on how roll coating with Alodine can save you substantial time, money and labor while boosting product quality through the ultimate in paint adhesion. Call your local Amchem Representative, or write us direct, but do it soon!

*Amchem's registered trademark for its conversion-coating chemicals for aluminum.

AMCHEM **ALODINE**

Amchem is a registered trademark of
AMCHEM PRODUCTS, INC. (Formerly American Chemical Paint Co.)
AMBLER, PA. • St. Joseph, Mo. • Detroit, Mich. • Niles, Calif. • Windsor, Ont.

MITSUBISHI INNOCENTI CWB

milling boring and combined machine

Universality, productivity and easy handling....

are characteristics of INNOCENTI-CWB milling, boring and combined machine.

MITSUBISHI ZOSEN (Mitsubishi Shipbuilding & Engineering Company) manufacture and distribute the FA 140/95 type (dia. of spindle 140 mm for milling, and 95 mm for boring) of this universally-known machine, licensed by INNOCENTI S.G. of Milano.

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U.S.A.: Pratt & Whitney Co., Inc., West Hartford · **Canada:** J. H. Ryder Machinery Co., Ltd., Toronto · **United Kingdom:** Henderson & Keay, Ltd., Glasgow · **France:** Société d'Etudés de Machines Outils, Outillages et Accessoires, Paris · **West Germany:** Frnst Polak, Stuttgart · **Switzerland:** A. Ritschard Machines-Outils SA. Geneve · **Norway:** A/S G. Hartmann, Oslo · **Finland:** OY Machinery AB, Helsinki · **Netherlands:** Technische Import & Export J.L. Bienfait, Aerdenhout · **Sweden:** Lundwall & Co., Göteborg · **Denmark:** Scandinavian Phoenix A/S, Copenhagen · **Spain:** Liner Sociedad Anonima, Madrid · **Belgium:** R.S. Stokvis & Fils S.A., Brussels.

MITSUBISHI ZOSEN

(MITSUBISHI SHIPBUILDING & ENGINEERING CO., LTD.)

Head Office: Marunouchi, Tokyo, Japan New York Office: Equitable Bldg., Broadway, New York

Machine tool manufacturing division
HIROSHIMA PRECISION MACHINE WORKS

Sole agent
MITSUBISHI SHOJI KAISHA, LTD.

ANACONDA FREE-CUTTING BRASS

Free-Cutting... Cost-Cutting

Year after year after year, engineers who know brass select Anaconda Leaded Brasses for their special characteristics and qualities.

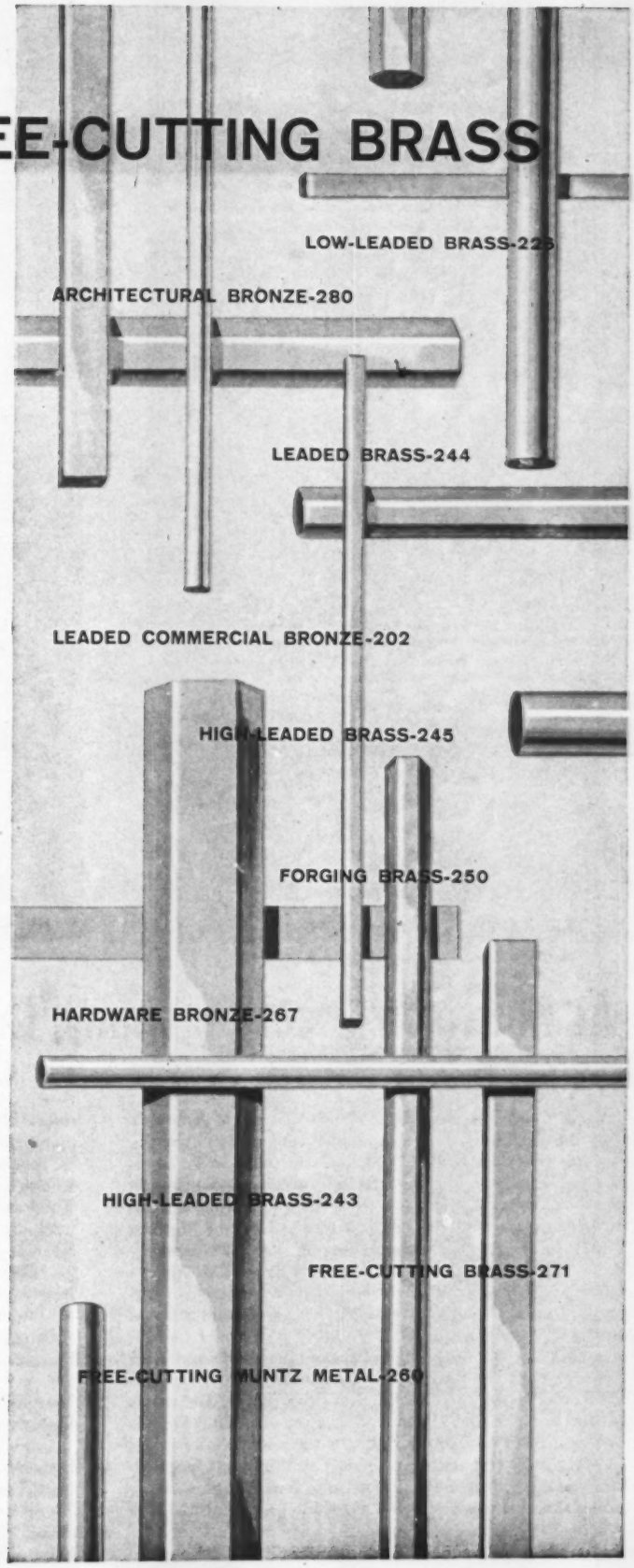
The superior machining qualities of Anaconda free-cutting brass rod permit the use of heavy feeds and high cutting speeds. Tool life is much longer; tool breakage considerably less. Close tolerances are held for longer continuous runs. What's more, you get fewer rejects, more accurate assemblies, and products with better appearance.

When you buy or specify Anaconda American Brass, you can choose from nearly 300 different alloys . . . the greatest range of sizes, shapes, tempers and characteristics in Copper and Copper Alloys. Contact your Anaconda representative or write: Anaconda American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario. 61-1147

FREE CUTTING BRASS

a product of

ANACONDA®
AMERICAN BRASS COMPANY



A welder simply tackwelds a Stainless Steel plate on a Komline-Sanderson "Coilfilter" drum. Stainless is specified because of its great strength, corrosion resistance and ease of fabrication.

Order Stainless Steel from your nearest Steel Service Center.

At Morrison Steel Company, they cut Stainless Steel

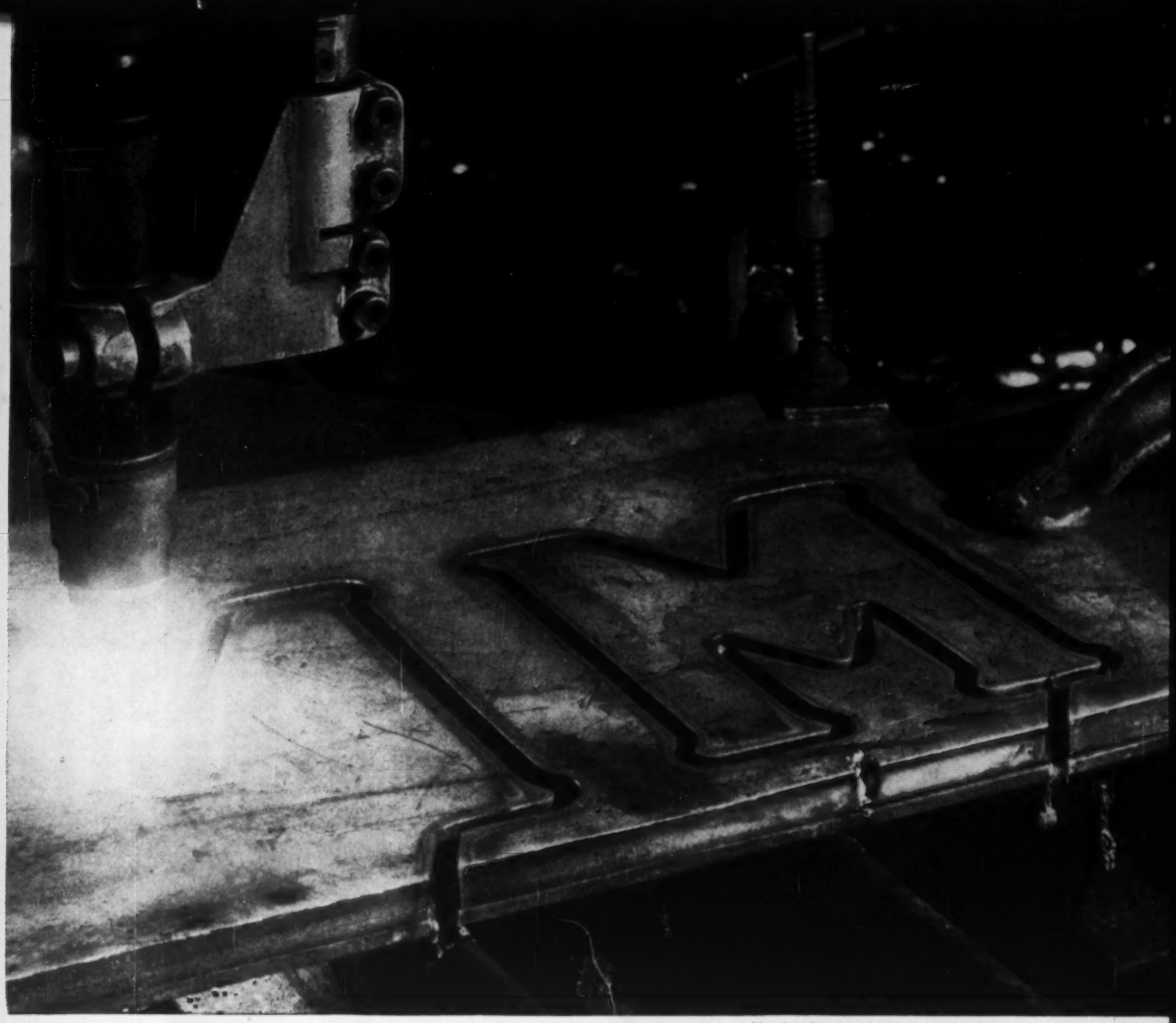
Morrison Steel Company, New Brunswick, New Jersey, is one of the leading carbon steel and Stainless Steel service centers in the East. It has been and continues to be headquarters for some important research aimed at developing new and efficient cutting processes for the Stainless Steel they sell. Morrison was the *first* service center to adopt the Linde Company's "Plasmarc" cutting process (formerly called "Heliarc") for cutting Stainless Steel. Morrison's customers have reaped the benefits of this extensive program, in terms of quality steel, faster deliveries and reduced manufacturing costs.

For considerable time—Morrison engineers worked with Linde Company, Division of Union Carbide Corporation, to find an efficient way to cut Stainless Steel plates. The result was Morrison Arc-Cut "Plasmarc" cutting of Stainless plates into rings, discs and contour shapes to exact tolerances. It could originally cut plates up to an inch thick, but has been further developed to cut Stainless up to four inches. Cutting Stainless Steel this way prevents carbide precipitation, does not distort or discolor the metal, and does not change machinability or magnetic permeability in the immediate adjacent area. Stainless parts can be used directly after arc cutting without pre-use preparation. Customers, in fact, order their parts directly from Morrison and save themselves an expensive fabrication step.

In brief, the basic function at Morrison remains the same: "Take a material from the shelf and put it on a machine." They are prepared to meet change. They employ men who work with blueprints; they have a formalized program for selling, service, merchandising and marketing. They employ 21 salesmen on the road and 15 men handle the phones. Morrison maintains its own fleet of trucks and garages. All of this means better service to their customer.

Operating in a modern 200,000-square-foot plant, Morrison Steel is considered a model steel service center. Morrison is a one-stop source with trucks that deliver daily to all points in New Jersey, eastern New York, eastern Pennsylvania and Delaware.

One customer who benefits from Morrison's cutting service is Komline-Sanderson Engineering Corporation of Peapack, New Jersey. Komline-Sanderson makes rotary vacuum filters. Their markets include industrial plants, municipalities, chemical plants and process industries, and their filters handle food, chemicals and drugs, among others. They use Stainless Steel in their filters because Stainless Steel's superior corrosion resistance prevents product contamination. Morri-



Morrison's gas-shielded arc cutter turns out intricate Stainless Steel shapes in one quick, smooth operation. The "Plasmarc" cut seldom needs post-machining or annealing and finished parts can be supplied direct from the warehouse using this cutting system.

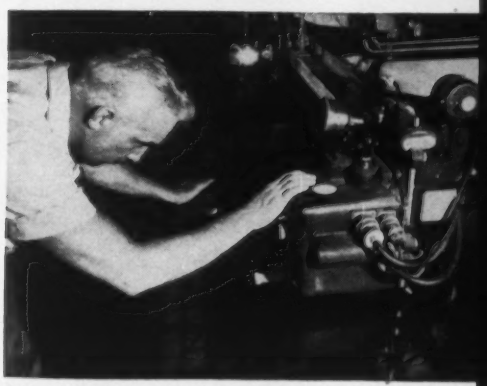
plates letter perfect

son furnishes Komline-Sanderson with Stainless Steel plates that are all ready for finished assembly because their arc-cutting operation can cut to extremely close tolerances and eliminate Komline-Sanderson's need for any further work on the plates before the filters are put together. Thus, a Stainless Steel service center becomes an actual parts supplier for a customer. Komline-Sanderson doesn't have to carry a big, expensive Stainless Steel inventory—Morrison does it for them—and they know they can count on prompt delivery from the warehouse.

Morrison's research doesn't end with an arc-cutting process. Recently, they installed, after extensive testing, several ultramodern electronic high-speed band saws that can also cut Stainless Steel to extremely close tolerances.

Morrison specializes in delivering Stainless Steel in large or small quantities to a vast number of customers. Often it is cut to exact order, ready for fabrication. Manufacturers depend on Stainless itself for superior corrosion resistance, excellent heat properties, good appearance and ease of fabrication. When you need Stainless Steel, get it from your Stainless Steel service center. USS is a registered trademark.

Morrison Arc-Cut is a registered trademark of the Morrison Steel Company. Plasmarc is a registered trademark of Union Carbide Corporation.



Operator at Morrison Steel checks "Plasmarc" setting.

USS **United States Steel**

Specify ROOTS® Rotary Positive Blowers

FOR CLEAN, DRY OIL-FREE AIR

Air comes out as clean as when it entered, with a Roots Blower. Operating without internal lubrication in the pumping chamber, this compact machine delivers a constant volume of air . . . free of oil vapor and ideal for combustion, aeration, agitation and other uses.

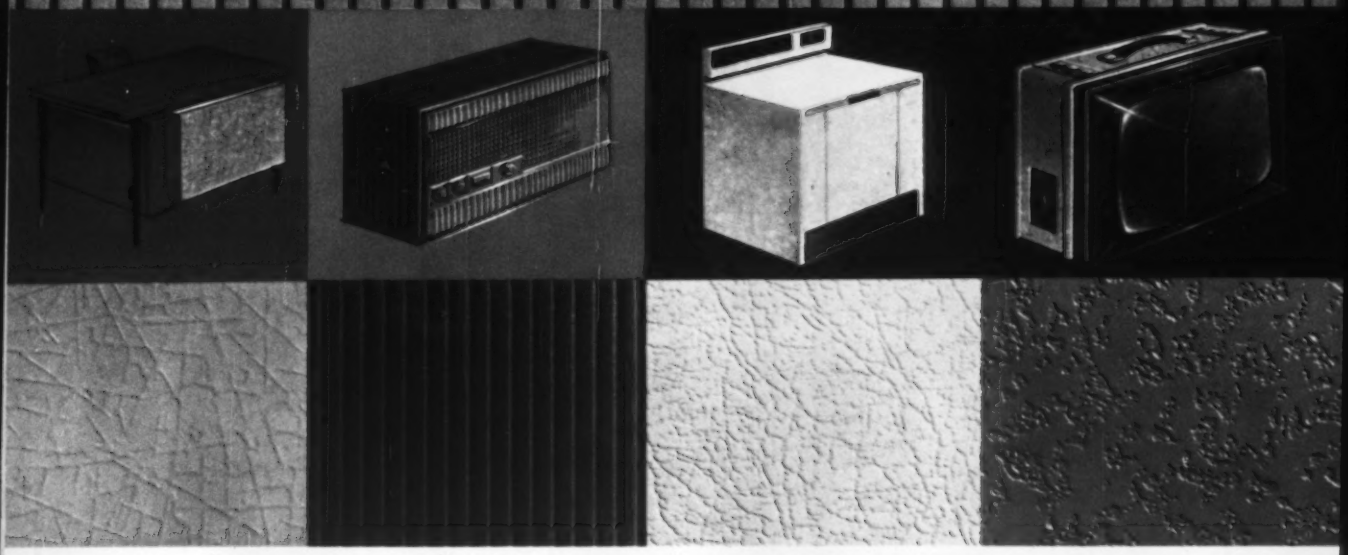
Dependable Roots design saves maintenance and downtime too. There is no mechanical contact inside the cylinder, no moving vanes, springs or valves to wear out. Standard parts are interchangeable. Horizontal or vertical inlet construction simplifies installation. Any type drive can be used.

Capacities range from 5 to 50,000 cfm, pressures to 12 psig. Higher pressures can be obtained by two-stage units. A companion line of Rotary Positive Gas Pumps is also available. Request Bulletins AF-258, XA-458, and RAS-261.

ROOTS® CONNERSVILLE

ROOTS CONNERSVILLE BLOWER
900 W. MOUNT ST., CONNERSVILLE, INDIANA
DIVISION OF
DRESSER INDUSTRIES, INC.
OIL • GAS • CHEMICAL
ELECTRONIC • INDUSTRIAL

PICK A PATTERN FOR YOUR PRODUCT FROM PITTSBURGH STEEL SHEET



Wrapper stock or drawn parts, flat panels or roll-formed fittings—whatever the application, Wide Pattern Designed Sheet gives finished products snap and sparkle that attract buyers, boost sales. Patterned Sheet—as wide as 60 inches, thicknesses from .0179 to .0897 inch—is available in commercial, drawing and AK drawing quality steel; has same fabricating properties as plain cold-rolled sheet in your processing equipment. Rolled-in designs—unlimited in range—take paint, enamel, porcelain, plated finishes. Investigate Wide Pattern Designed Sheet—steel with decorative appeal, from . . . PITTSBURGH STEEL COMPANY, Pittsburgh, Pa.

for other steel specialties turn page.

HOW "BOSTON" PROFITS FROM THOMAS NICKEL-COATED STRIP

Thomas Strip buffed nickel-coated steel strip reflects 40% saving, fewer production steps for C. Howard Hunt Pen Co.'s pace-setting "Boston" pencil sharpeners.

At Statesville, N.C., Hunt Pen blanks, embosses, pierces, spot-welds wrapper stock for sharpener cases from coils of 2 by .010-in. buffed nickel-coated steel. Firm has depended on Thomas Strip Division of Pittsburgh Steel Co. 20 years for brilliant finish. Purchasing Agent T. V. McCurdy tells why:

"We once used stainless for wrapper stock but costs skyrocketed. Thomas Strip costs 40% less, gives us handsome appearance, durability and easy fabrication of steel. It eliminates expense and headaches of plating, too.

"We're more critical of this material than any other—the slightest scratch stands out. We've never had to reject any during our long relationship with Thomas."

Hunt Pen produces more pencil sharpeners with nickel-plated strip than any other U.S. manufacturer. Assembly of "Champion" portable model is shown above.

Want to learn how Thomas Pre-Coated Strip Steel Specialties can help you? Ask, and we'll show you.

"WE GET BETTER PRODUCTS FOR LESS WITH THOMAS PRE-PAINTED STRIP," SAYS NATIONAL GYPSUM COMPANY

Tough, durable vinyl-enamel coat on Thomas Pre-Painted Strip fabricates easily as plain steel, gives a profitable boost to "Gold Bond" quality of National Gypsum Company's metal building products.

Exposed pre-finished partition bases, cornice moldings, wall trim and "J" suspension channels are roll-formed by National Gypsum Company's Niles, O., Metal Building Products plant. Coiled strip sizes range from 18 to 24 gage in widths $2\frac{17}{32}$ to $4\frac{1}{2}$-in., painted one side with white, grey or red, and wash-coated opposite side.

"Thomas Strip Pre-Painted gives us products far superior to those we got when we spray-painted after forming. It saves us 8.75 to 9.2% of production cost and reduces inventory problems," says Plant Manager D. K. Archer.

"The paint coat has better adhesion and takes roll forming without cracking or peeling. Thomas supplies us superior material of uniform, consistent quality that suits our requirements."

Photo below: roll forming 10-ft. Snap-On bases.

Eliminate your paint-line problems with Thomas Pre-Painted Strip. Let us show you how.

PITTSBURGH STEEL COMPANY

SQUEAKS, RATTLES SILENCED WITH THOMAS PLASTIC-COATED STRIP

Primary use of Thomas Plastic-Coated Steel is in decorative applications. But it performs a unique practical task for manufacturers of fine furniture.

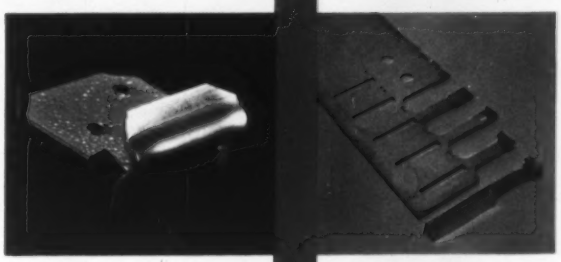
Laminated to Thomas cold-rolled strip, the plastic coating assures absolutely noiseless functioning of modern, strong steel springing.

Universal Wire Spring Division of Hoover Ball & Bearing Co., Georgetown, Ky., uses Thomas Plastic-Coated Strip to make spring retainer clips that anchor its sinuous wire Uni-Torq and Uni-Flex springs to furniture frames.

"We tried applying pressure-sensitive tape to steel for this clip, but decided on Thomas Plastic-Coated. It's pre-finished and doesn't slip or peel in forming or in use," says Bernie J. Johnson, sales vice president, upholstery spring division.

"The clip acts as a pivot as well as an anchor for our engineered seating springs. Steel against steel produces squeaks and rattles. The plastic coating eliminates them—and makes an important sales point."

Decorative or functional —whatever the need, Thomas Steel Specialties will make your product better, too.



THOMAS STRIP HELPS "BUILD A BETTER MOUSETRAP"

World's biggest trapmaker, Animal Trap Co. of America, has the long-sought "better mousetrap." And Thomas Strip Copper-Coated Steel helps make it so. Rattraps, too.

Animal Trap Co. of America, Lititz, Pa., has depended on Thomas Strip over 25 years for close tolerance copper-coated steel strip to make bait pedals, locking bars for a dozen models.

The firm produces millions yearly from Thomas electroplated stock in sizes from .4375 by .025-in. to 5 by .035-in., #2 temper. Precise tolerances, consistent temper of base steel allow long, trouble-free runs through progressive dies, automated assembly lines.

"Base steel gives strength, economy—the planished copper finish provides appearance and corrosion resistance needed to out-sell cheap foreign-made traps," says Sales Vice President D. S. Morrison.

Want the world to beat a path to your product's door? Thomas Strip plain or coated steel specialties may be what you need. Ask.

PITTSBURGH STEEL COMPANY

BRASS-COATED THOMAS STRIP SAVES FOLDING-RULE MAKER 60% IN METAL COST

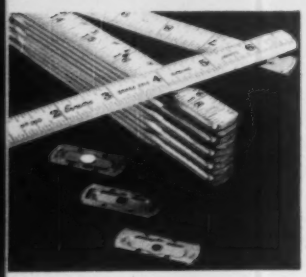
Thomas Strip Brass-Coated steel measures up to strict cost, tolerance, strength and appearance standards for Evans Rule Co. of Elizabeth, N.J., leading producer of measuring rules and tapes.

An improved type of wood folding rule—assembled with 11 patented spring joints, fabricated from Thomas electro brass-coated strip—is produced for Evans by a subsidiary—Fabrule Co.—in a fully automated plant.

For rule joints, Evans buys two sizes of Thomas brass-coated strip—1.812 and 1.562 in. wide by .012-in. thick, #3 temper, planished and oiled.

"Brass-coated strip saves us about 60% over what we'd pay for pure brass for rule joints," says John J. Evans, board chairman.

"Besides that, the base steel supplies strength to take abuse, as well as rigidity needed when the rule is opened. The brass coat provides protection against corrosion and the planished finish results in a sales boosting appearance. Physically, width and temper uniformity is critical for processing through our automated lines."



Do expensive metals hike your product cost? Inquire how Thomas Strip pre-coated steel can help you save.

The STEELMARK on a product tells you it is made of steel. Look for it when you buy.

Steel

NEW—BRUSH PATTERN DESIGN FOR THOMAS PRE-COATED STEEL

Here's a **brand new** addition to Thomas Strip Division's wide range of pre-coated and pattern designed finishes for decorative applications.

Called "Brush Pattern Design," this new Thomas Strip specialty reduces finishing costs, enhances sales appeal through its deep, lustrous, textured and buffed surface—offers products attractive "plus" that influences buying decision, moves items off the shelf.

"Brush Pattern Design" is cold-rolled strip electroplated with copper, brass, nickel or zinc coating, buffed to soft highlighted finish, protected by clear lacquer.

New Thomas Strip technique produces Brush Pattern Design Strip with uniform, nontarnishing plated coating across entire surface. Fabricates easily, without distortion of pattern finish.

Reduce your product's finishing costs, improve its appearance with Thomas Brush Pattern Design. Thomas experience, design help is yours for the asking. Call or write.

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PITTSBURGH STEEL COMPANY

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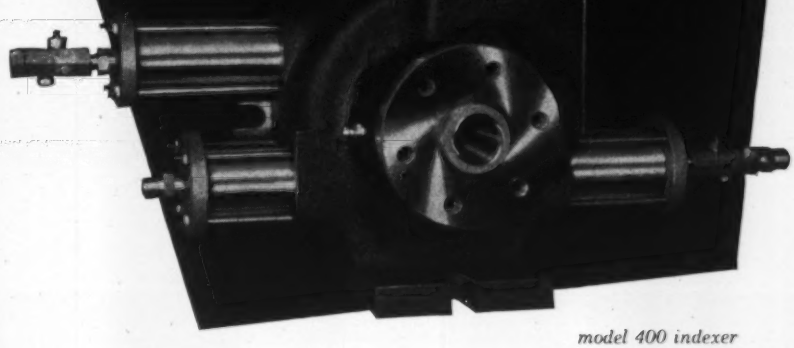
For speeding precision production

AUTOMATE

with

Erickson Indexers

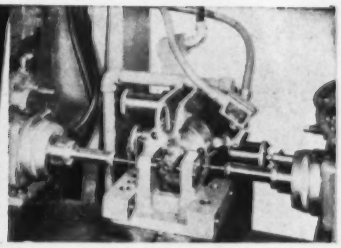


model 400 indexer

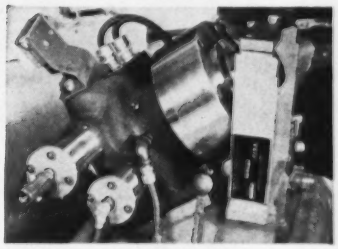
Perhaps these actual applications of automation will trigger your imagination . . . show you how Erickson Indexers can help you smash bottlenecks in your own production operation.

You can interlock them into production setups with microswitches and solenoid valves. And with Erickson Indexers you automatically get consistent positive positioning within 2 minutes of a degree . . . repetitive accuracy in low "tenths" of a thousandth.

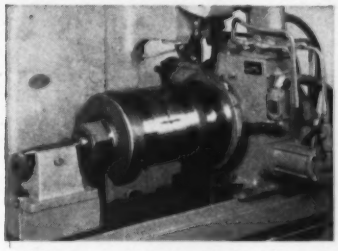
Speed to keep lines humming . . . accuracy to banish rejects . . . long life to slash maintenance and capital investment—all add up to Erickson Indexers. A-1562A



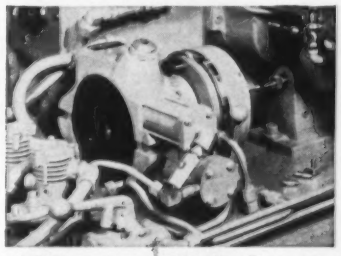
Automatic drilling of cross holes being done on Erickson Model 400 Speed Indexer with air cylinder and Expanding Drawbar Mandrel. Indexer equipped with interlock limit switches.



Angular drilling in jet part held in air operated collet chuck on Erickson indexer operating automatically. Entire fixture designed and built by Erickson.



Using end-clamping for half bearing, machine mills 8 oil grooves then skip indexes back to starting position for next part.



Milling four and six flats on needle valve part. Owing to size, part is placed in tail stock head-first, and tail stock then positions it in chuck and retracts.

ERICKSON TOOL COMPANY

34352 SOLON ROAD • SOLON, OHIO

COLLET CHUCKS • EXPANDING MANDRELS • AIR-OPERATED CHUCKS • FLOATING HOLDERS • TAP CHUCKS
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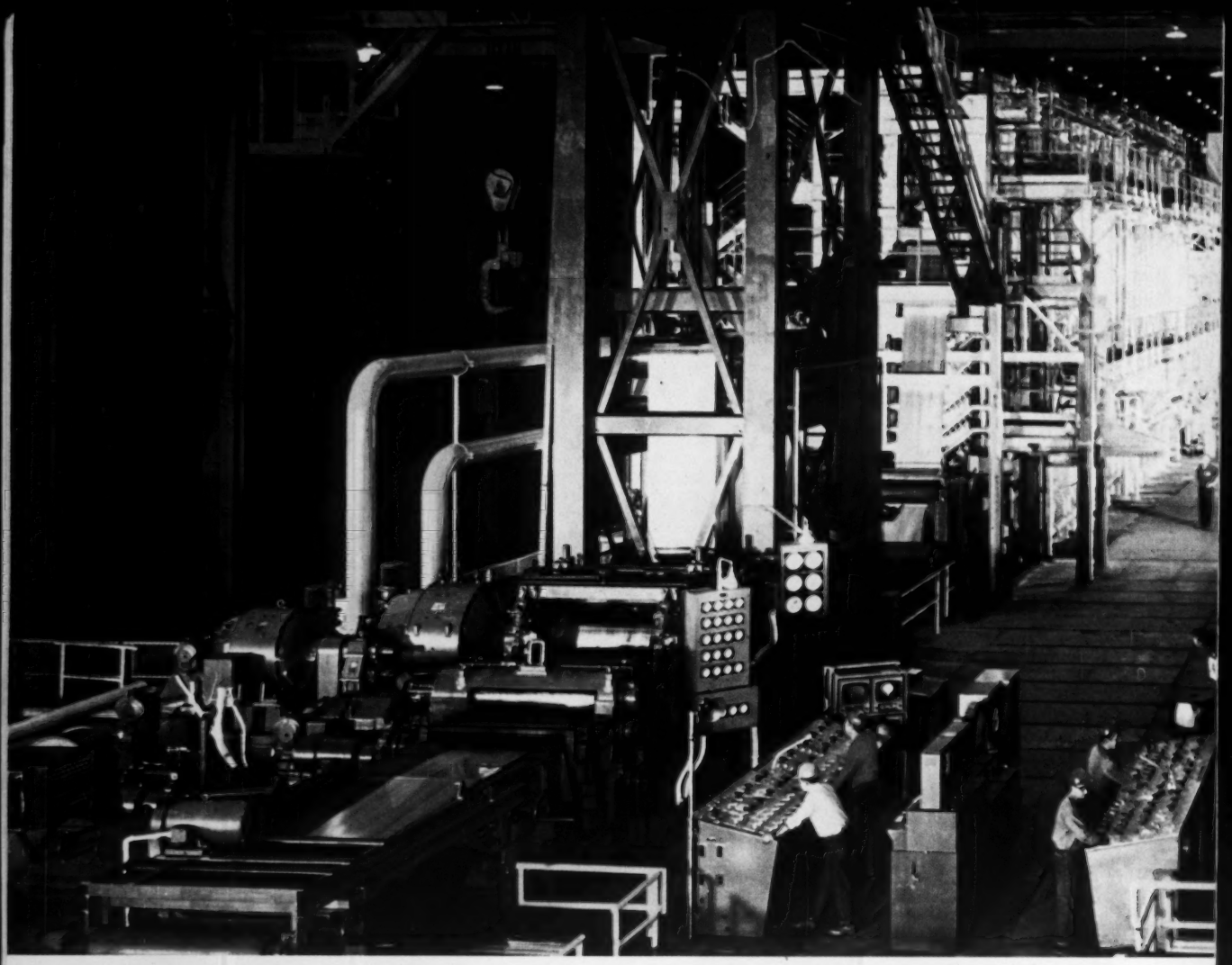


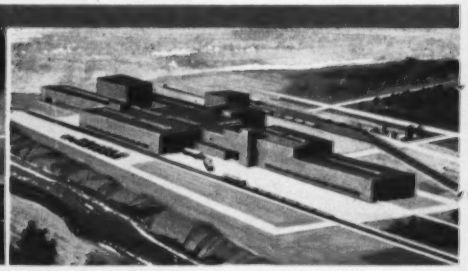
NATIONAL STEEL'S WEIRTON DIVISION

You're looking at Weirton Steel's new continuous cleaning and annealing line. This line, able to handle 2,000 feet of strip steel a minute, is among a host of strategic improvements now operative at this major National Steel division. Combined result: the fastest flow of the finest tin plate, galvanized and cold-rolled sheets ever produced by this quality steelmaker.

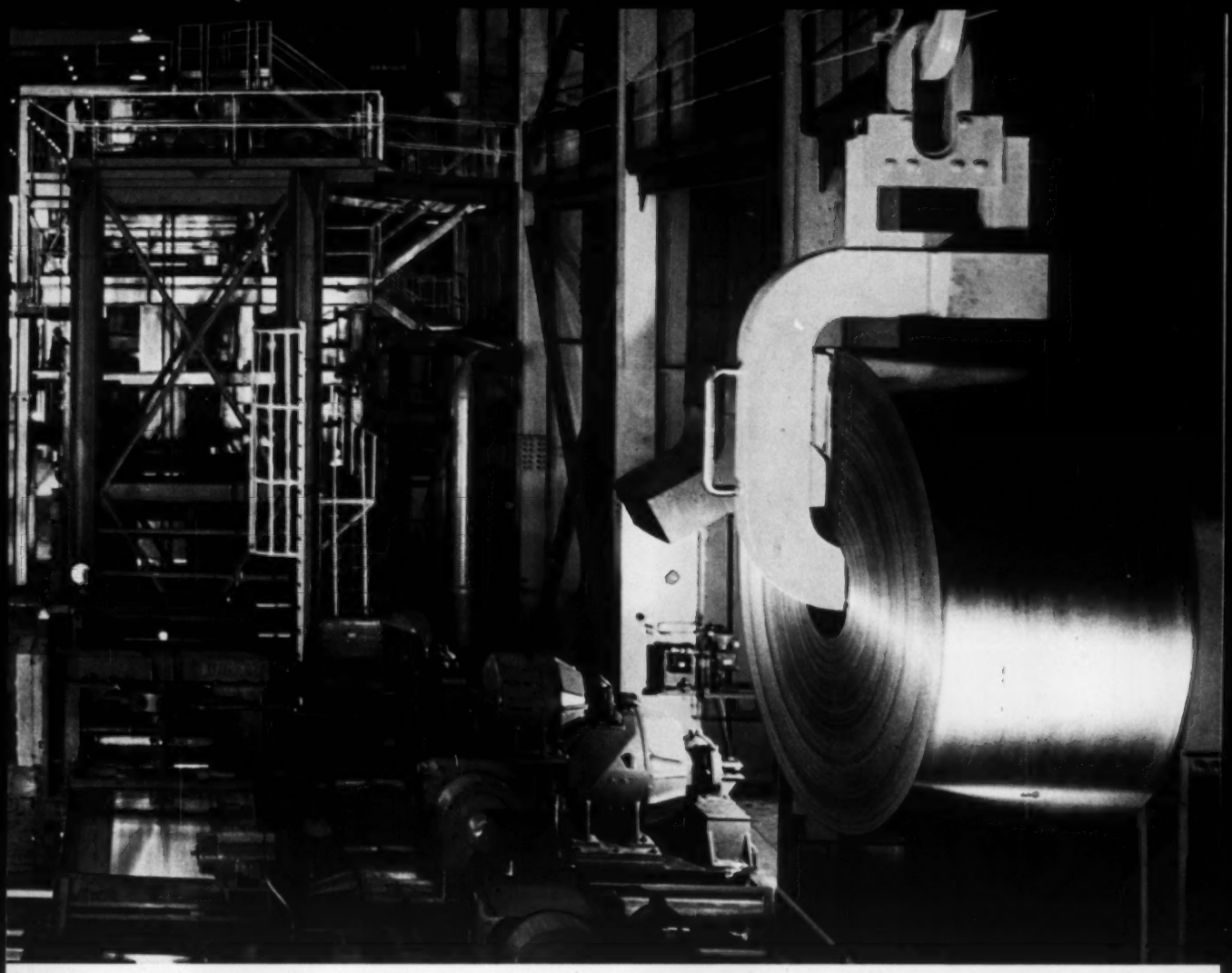
Weirton's new and improved facilities bolster practically every phase of production. *Example:* daily oxygen supply more than doubled through a new large-scale dual oxygen plant. *Example:* a big boost in blast furnace production and efficiency from an increase in hearth diameter, greater stove capacity and automatic stove change-over equipment. *Example:* faster output of tin plate in coils through a new 4,000-foot-per-minute side trimming line. *Example:* greater speed in the production of cold-rolled steel through a new four-stand tandem cold reduction mill. *Example:* even more capacity for making tin plate through two new electrolytic tin-plating lines.

FIVE OTHER MAJOR STEPS TO FURTHER PROGRESS

AT GREAT LAKES STEEL in Detroit, the computer-controlled and operated 80" Mill of the Future—fastest, most powerful hot-strip mill in the world—is providing more and better automobile body sheets.



AT MIDWEST STEEL near Chicago, the most modern and efficient steel finishing plant in existence will provide industry with the finest quality tin plate, galvanized sheets, hot- and cold-rolled sheets.



FLEXES NEW STEELMAKING MUSCLES

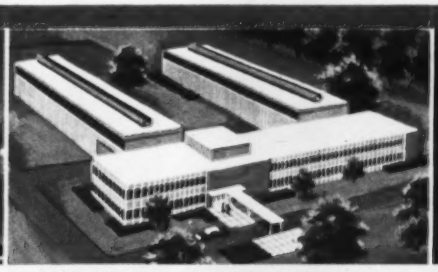
Yet Weirton's greater steelmaking capability is just *one* accomplishment in a program of expansion and improvement in which we are investing well over $300,000,000. This program means more than a better supply of the highest, most uniform quality of steel for our customers. It means more secure jobs for our employees and better values for you, the ultimate consumer of the million and one products made of steel. Other phases of this program will swing into action soon. And we will be bringing you news about them too.

NATIONAL STEEL CORPORATION, PITTSBURGH, PA.

SUBSIDIARIES AND DIVISIONS:

GREAT LAKES STEEL • WEIRTON STEEL • MIDWEST STEEL • STRAN-STEEL • ENAMELSTRIP • HANNA FURNACE • NATIONAL STEEL PRODUCTS

AT STRAN-STEEL in Terre Haute, new finishing-line facilities are boosting quality and output of popular color-coated steel panels for Stran-Steel's handsome new line of contemporary pre-engineered buildings.



NEW RESEARCH CENTER at Weirton, W. Va., will be National Steel headquarters for the continuing exploration of new and better raw materials, facilities, manufacturing processes and products of steel.

NEW BASIC OXYGEN FURNACES at Great Lakes Steel. Construction will start in 1961 on two basic oxygen furnaces — the largest ever built — which will add new capacity and greater efficiency.

Quantity
PRODUCTION
of
GREY IRON CASTINGS

*

ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES

*

ESTABLISHED 1866

THE WHELAND FOUNDRY

DIVISION OF GORDON STREET, INC.

MAIN OFFICE AND MANUFACTURING PLANTS
CHATTANOOGA 2, TENNESSEE

CONSUMERS' PLANS TO BUY AUTOS are on the rise. This was reported in the July quarterly survey on Consumer Buying Intentions of the Federal Reserve Board. Plans to buy cars were reported by 3.4 pct of families interviewed. This compares with 3.1 pct a year ago. But plans to buy houses and most household durable goods remained at year-earlier levels.

WHAT WOULD TRIGGER INVENTORY ACCUMULATION was the special question in the August survey of the National Assn. of Purchasing Agents. Here, in order, is what makes PA's stock up: Fear of work stoppages, lengthening lead times, anticipated price rises. At the present time, 45 pct expect to hold tight on stocks.

SMALL BUSINESSES ARE WINNING more government prime contracts. A record $121 million in prime contracts were awarded in July. This is a 32 pct increase in value over those awarded under SBA programs in July 1960. The number of contracts awarded rose by 70 pct.

ORDERS FROM INDUSTRIAL DISTRIBUTORS to manufacturers of production tools, equipment and supplies dropped 0.5 pct in July from June. This was in the face of a 3 pct rise in the seasonally adjusted durable goods production rate. The July dip in distributor orders halted a rising trend of past months.

A NEW HOUSING MARKET in vacation homes is fast developing. Builders estimate that 75,000 to 100,000 will be built this year. And a swing to retirement homes is noted. The potential here is estimated to be 225,000 units per year, about one-sixth of all housing. These homes often feature special accessories and smaller capacity appliances.

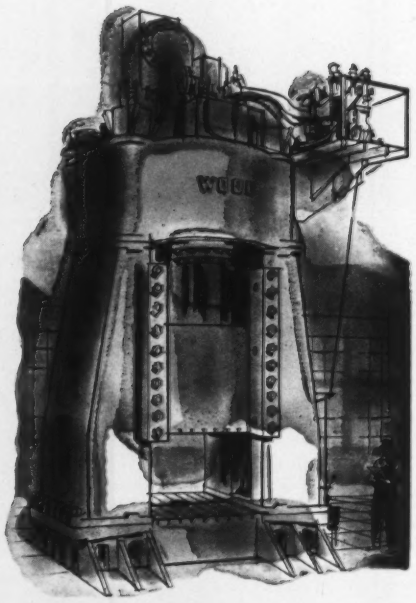
THE INDEX OF THE AMERICAN GEAR MANUFACTURERS ASSN. shows a 0.1 pct decline in July from June. The July index was 219.8 (1947-49=100) for new bookings, below the 1960 average of 235.5. July shipments index was 200.1, down from 245.4 in June.

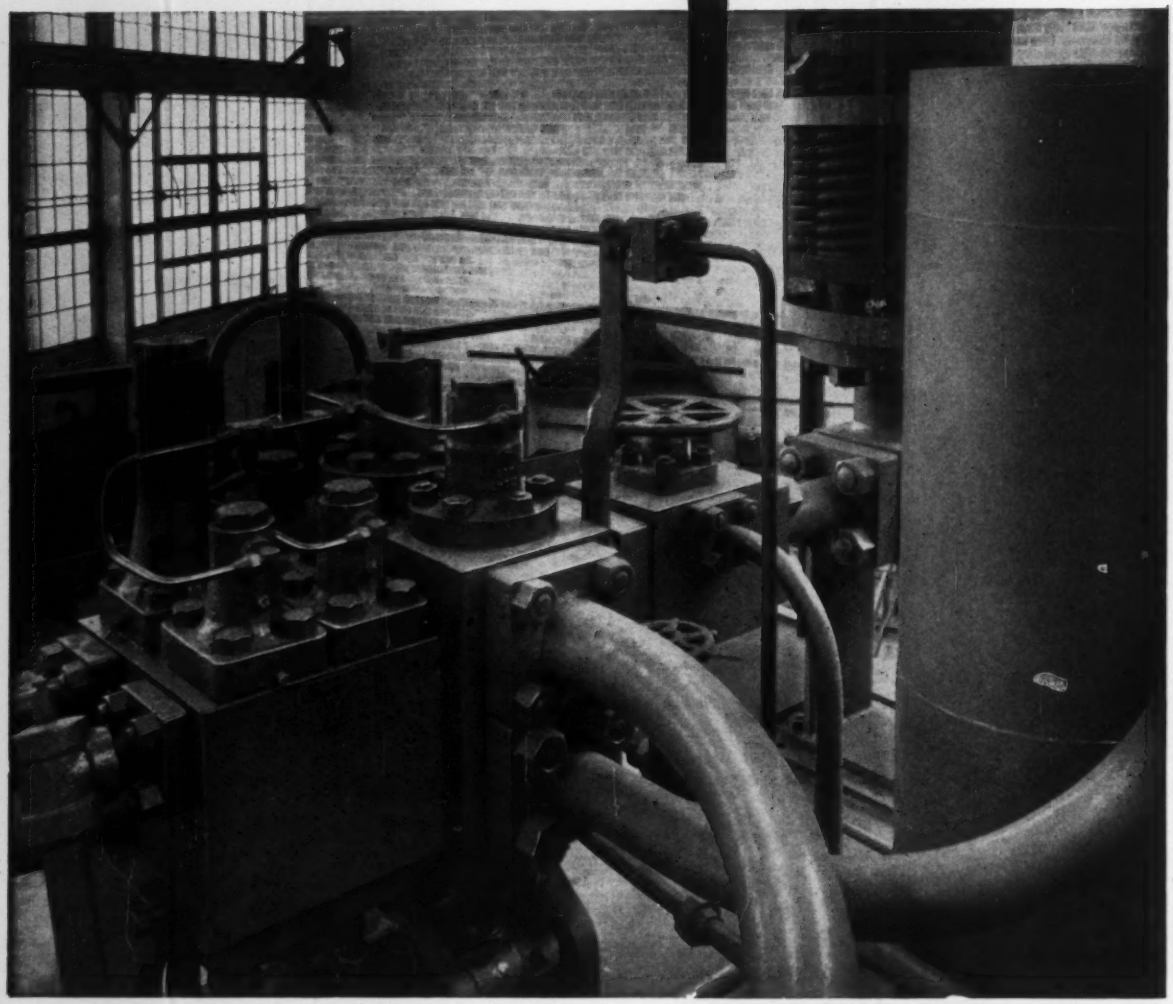
BIG DEVELOPMENTS IN GAS industry are expected to result in 114 pct more sales by 1970. This is a forecast of W. G. Hamilton, Jr., president of the American Gas Appliance Manufacturers Assn. He predicts 925,000 miles of gas pipelines by 1970, a 30 pct gain. Other gain areas: Air conditioners, disposers, lighting.

Treat 'em rough, These Wood Valves can take it.

Presses take a beating? No need to worry about the effect on your hydraulic system if Wood Valves are at work. They're built to handle the toughest jobs. For example, this 3″x1½″ special main control valve is installed on a 1500 ton forging press. Operating conditions demand extremes in acceleration and deceleration, yet the valve assures shock-free, efficient service due to its inverse flow design. Control of the ram is precise, accurate . . . with shockless decompression. You can also see a fully balanced throttle valve and a 3″x7″ shock alleviator, further examples of Wood's complete line of quality high-pressure valves. Write today for complete information.

R. D. WOOD COMPANY
FLORENCE, NEW JERSEY





Arms Buildup Starts to Show In New Defense Contracts

Spending this fiscal year will be compressed into nine months, with resulting speedup.

Bigger spending this year, however, is only the forerunner of a long-range defense buildup. By R. W. Crosby

■ Industry will soon feel the impact of spiraling defense spending. Steel mills, auto plants, machine tool shops, aircraft makers, ship builders, and others will feel the direct effects of new defense orders in the coming months of fiscal 1962.

The hardware, the volume, and the timing involved in the biggest military spending spree since World War II revolves around $18.4 billion planned contract payments from government to industry.

This $18.4 billion is that part of defense money set aside for procurement in the year beginning this past July 1. The new defense budget of $46.7 billion includes an estimate $17.1 billion for procurement. Defense budgeteers add on $1.3 billion in funds from prior years expected to be spent this year.

That $18.4 billion is $4 billion more than spent last year. Here is what it will buy, how much, and when:

Hardware — The bulk of the money will go for new aircraft, new missiles, new ships, and new ammunition. But it also includes new cars and trucks, new machine tools, and other new equipment.

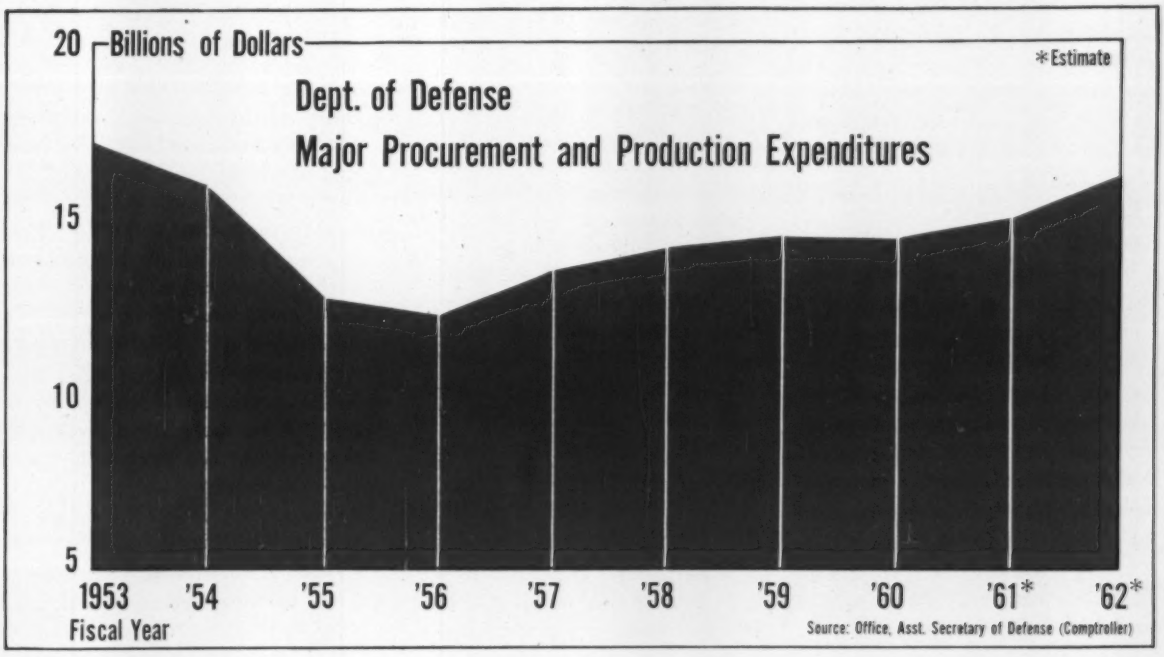
Volume — The defense budget makers break the $18.4 billion down like this:

Procurement Fiscal 1962

Aircraft	**$6.2 billion**
Missiles	**$4.3 billion**
Ships	**$2.6 billion**
Ordnance (other than in above)	**$1.9 billion**
Electronics (other than in above)	**$1.5 billion**
Other Procurement	**$0.6 billion**
Funds from prior years	**$1.3 billion**
Total	**$18.4 billion**

Timing—President Kennedy signed the defense budget bill into

Defense Spending Reflects World Tension



law only last month. Big defense contracts under the new budget are still to be let. Defense Dept. planners can't predict exactly when the biggest surge in spending will come. But the impact will begin to be felt next month. Therefore, a year's spending will be compressed into the final nine months of fiscal 1962.

The timing is also affected by orders that all items purchased are for delivery "as soon as possible." This is an outgrowth of mobilization plans which caused the increased spending in the first place.

Robert S. McNamara, Secretary of Defense, points out the urgency of procurement. He says:

"The items included in our new procurement list are chiefly those which would be most urgently needed by our forces if they were to be committed to combat soon; and which can be ordered and delivered quickly. The additional quantities to be procured are not only to equip the forces now on active duty, but also those reserve forces which have to be ordered to active duty."

Berlin Reaction—The Berlin crisis is now. Therefore, the military needs the hardware as close to "now" as possible. As Sec. McNamara points out, the crisis also means the call up of thousands of reservists. Some 76,500 have been called for Oct. 1. These men have to be fed and clothed. They need new parts and spare parts for the weapons and equipment they didn't need as "weekend warriors."

For industry, it all adds up to a bulge in new orders starting in October.

Which industries will get new orders, and how will they be affected? This is explained by Assistant Secretary of Defense Thomas D. Morris. Sec. Morris, Defense Secretary McNamara's procurement assistant, says food and textile industries will feel the greatest impact of increased spending. New servicemen have to be clothed and fed. For the metalworking industries, there will be an indirect effect here through textile machinery and food packaging.

DEFENSE DEPT.'S MORRIS: "Fiscal year 1962 budget will increase steel requirements by perhaps 10 pct, but not more than 15 pct over current levels."

Future Effects—And even more dynamic in its effect on industry will be future defense spending. The spending curve will continue upward.

The buildup for the Berlin crisis will gather momentum. Other brink-of-war flareups will occur. The result will be continued warlike mobilization and continued defense budget hikes to pay for it.

Administration officials already are talking about still more defense spending stepups. Doing the talking is a man who ought to know. He is Budget Director David E. Bell. Mr. Bell says military outlays in fiscal 1963 will top 1962. In 1963, he says, "There will certainly be some further military and space expenditures."

Army, Navy, and Air Force leaders already are planning future spending programs. The matter of future planning is summed up by Navy Secretary John B. Connally, who points out:

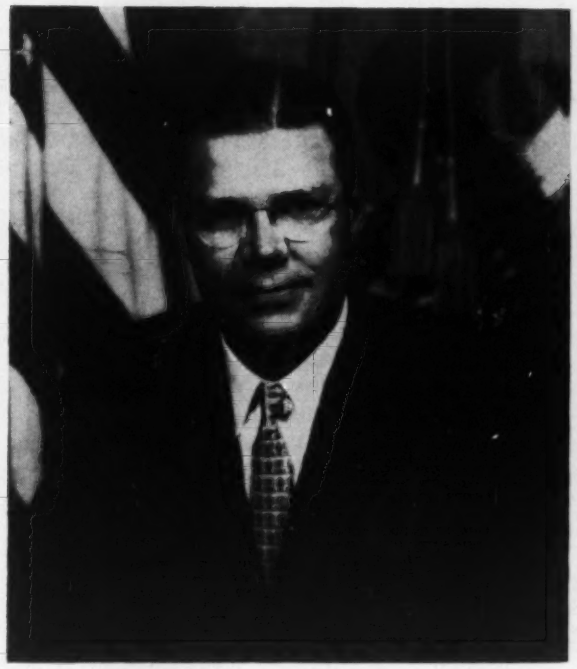
Modernize—"If we are to meet our commitments, we must do something about our aging ships and aircraft. We cannot wait much longer to start catching up by building more new ships and aircraft to replace those that are obsolete and overage.

"We must increase our limited war capabilities as rapidly as possible within budget limitations, and build up an adequate stock of conventional weapons for this purpose."

When It Hits—But the direct effect on metalworking industries will be great. Sec. Morris and his staff of procurement experts predict that a general upturn in the Defense Dept.'s use of all metals for fiscal year 1962 will be up about 10 pct. For steel alone, the jump may be even more, Mr. Morris told The IRON AGE.

"Military production and construction currently require about 290,000 tons of carbon steel, 75,000 tons of alloy steel and 15,000 tons of stainless steel per quarter. These already reflect the impact of missile base construction and the increased shipbuilding program.

"It is anticipated that the fiscal year 1962 budget will increase steel



McNAMARA: "Items on our new procurement list are . . . most urgently needed by our forces if they were to be committed soon."

NAVY'S CONNALLY: "We cannot wait longer to start catching up by building new ships and aircraft to replace those obsolete."

requirements by perhaps 10 pct, and not more than 15 pct over current levels."

Blueprint of Orders — The procurement specialists under Sec. Morris give this blueprint for new orders in metalworking and related industries:

Machine Tools — Machine tool building will get a big shot in the arm from the Defense Dept. "First estimates," say the procurement experts, "indicate the Defense Dept. will spend about $100 million for machine tools in fiscal 1962. This will mean purchase of about 4500 units." This is more than double the $44 million spent last year on machine tools for the Army, Navy and Air Force. On top of this, many of the Defense Dept.'s reserve machine tools, some of them standing idle in defense plants, will be put to use.

Automotive—Detroit will get big automotive orders from the Army. Army funds contain $343 million for tactical support vehicles and $398 million for combat vehicles. Defense Secretary McNamara points out that vehicles represent the largest category of Army spending for equipment and weapons. He says: "This includes a very large number of trucks and trailers. In fact, the 1962 funds for this purpose are several times the value of the 1961 program."

Last year the Army had only $188 million for tactical and support vehicles, $155 million less than this year. And for combat vehicles the Army had only $258 million last year, $140 million less than this year.

Ammunition—Ammunition makers will have to fill orders almost double what was anticipated. The original 1962 budget called for about $280 million in ammunition spending. Congress ended up giving more than $440 million for ammo.

Ships — Private shipbuilders will get about $835 million in contracts for ship construction and overhauls. These Navy contracts will come on top of some $868 million already given private yards for construction of Polaris missile-firing submarines this fiscal year. The total $1.7 billion to private yards will build 42 new ships and overhaul one vessel. The rest of the $2.6 billion budgeted for ships will go to government shipyards and bring the number of new ships to be built to 52 and number of overhauls to 22.

Aircraft—The $6.2 billion to be spent for aircraft will be spread through industries doing business with the Army, Navy and the Air Force.

Missiles — The $4.3 billion for missiles will mean increases in production of many types.

The Army will greatly increase the number of Honest John missiles. Hawk missiles for tactical air defense will also be increased.

The Navy missiles to show the most increase will be Bullpup air-to-surface missiles; Sidewinder and Sparrow air-to-air missiles; and the surface-to-air Tartar, Terrier and Talos missiles.

Additional Air Force missiles will include Sidewinders, Bullpups and Falcon air-to-air missiles.

Jobless Problem Grows Bigger

New Solutions Needed to Cut Unemployment Rate

Recovery fails to cut down jobless rolls. Labor Secretary Arthur J. Goldberg sees rate still "too high" by year-end.

Structural unemployment calls for new long-term solutions by industry, says labor expert.
By J. D. Baxter

■ Labor Secretary Arthur J. Goldberg faced a press conference last week and announced the August jobless rate as 6.9 pct of the workforce. This was the ninth straight month the rate held at about the same level, the longest stretch at such a high level in 20 years.

The announcement carried a message to industry that went beyond the dour statistics. A new united government - labor - industry effort may be needed to meet the jobless challenge.

The soothsaying of economists that job increases "classically" lag behind business recovery is wearing thin. Even in the face of further expected recovery, Mr. Goldberg forecast a jobless rate of 5-6 pct at the end of the year. He termed this, "too high."

Look Ahead—And looking into next year, the Labor Secretary said the economy must come up with 10.5 million new jobs if full employment is to be achieved. The unofficial verdict of the Labor Dept. is that the jobless problem will be around for a long time.

Mr. Goldberg cited ways the government is fighting the problem: Area redevelopment, the new Housing Act, new social security benefits, higher minimum wages and stepped-up military spending. And he said he expects enactment of the Retraining Bill.

But he flatly stated, "These measures alone will not solve the problem."

"Spotty" Efforts — Unions are fighting the problem with special approaches to retraining workers. And industry is making efforts along the same lines. But some in the Administration think industry efforts are "spotty."

In a post-conference IRON AGE interview, Dr. Seymour L. Wolfbein, Labor Dept. Manpower Chief, gave further insight into possible industry involvement.

"What is needed," he said, "is a systematic approach to the problem by industry."

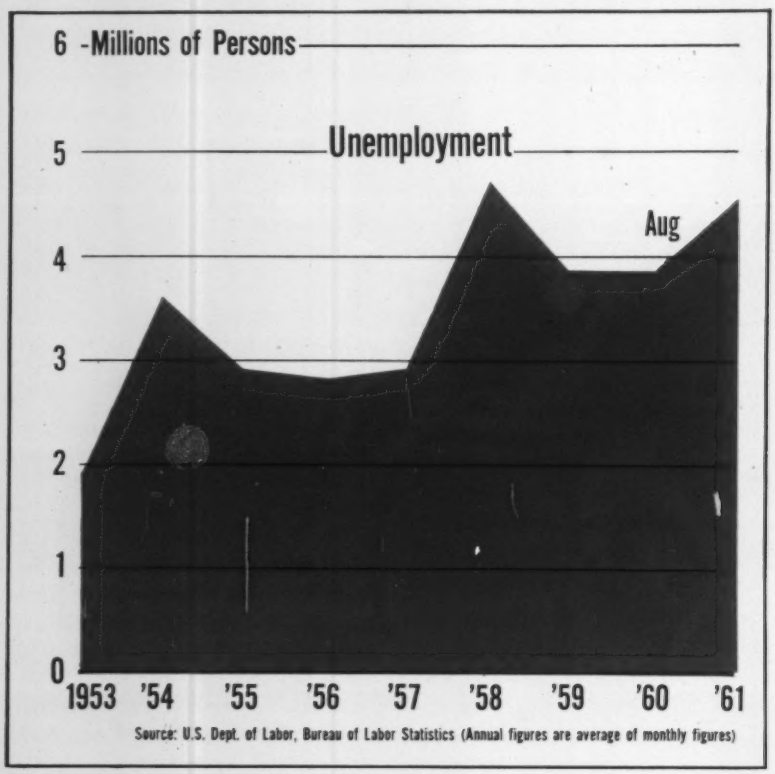
He added that further cooperation of industry, unions, and the government is developing, and is a "must."

Dr. Wolfbein has just returned from Sweden, where he studied that country's "model" labor - management-government relationship. He said he feels the U. S. is swinging to their approach to employment.

Swedish Approach—Swedish industrialists are also caught in the trap of a growing workforce and job-robbing technical advances. But they prefer to pay into a training-retraining fund instead of paying for unemployment compensation, which some U. S. industries yielded to in collective bargaining.

Says Dr. Wolfbein: "This is possible in Sweden because they plan ahead. They see the advance of soaring productivity as new equipment and processes are planned.

Sign of Times: No Help Needed



Source: U.S. Dept. of Labor, Bureau of Labor Statistics (Annual figures are average of monthly figures)

And before the jobless are on the streets a fund is created to pay for their retraining."

Dr. Wolfbein feels the U. S. approach has reached its limits in unemployment compensation, extended payments, and supplementary unemployment benefits. There is no "preventive" quality to these payments.

The Training Act, he feels, is the first concrete step on a national scale towards this new approach.

"The government," said Dr. Wolfbein, "doesn't intend, and doesn't want to run the entire retraining program. Industry must bear its burden."

Broad Problem — He explodes the "escapist" idea of those in business who feel full recovery will absorb all the unemployed, and that the problem is only cyclical.

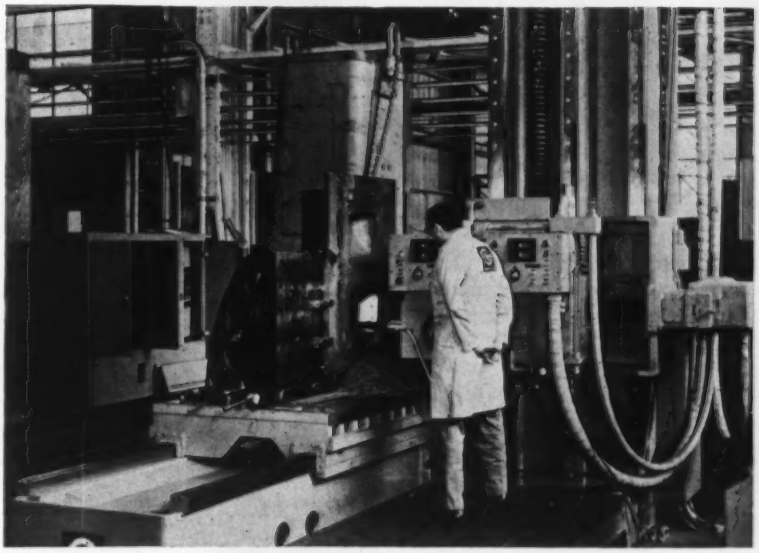
"We are going through a revolution in the structural manpower situation in this country," said Dr. Wolfbein. "We are now the only country in the world with more employed in services than in the production of tangible goods. And 1957 marked the first year that white collar workers exceeded blue collar workers in numbers. New approaches are needed to meet problems that have no precedent."

Changes in markets play the leading role in structural shifts, according to the manpower specialist. But productivity gains also play a major role.

"Productivity gains in goods-making industries have been fabulous," he says. "And they have to continue to be to maintain a competitive international posture.

"This will mean more jobless, especially as 26 million new young workers will hit the job market in the 60s'. Industry must systematically plan now to meet its burdens in the present and growing problem."

Much of the unemployment problem stems from job displacements in durable goods manufacturing. From 1957 to mid-1961 there was a drop of 800,000 production workers in durable goods industries.



CONTINUOUS MOTION: This Giddings & Lewis contour miller operates with three axis of continuous, programmed motion.

Numerical Controls Speed Space Work

■ Installation of a group of "second generation" numerically controlled profilers at Douglas Aircraft Co. will speed up space age machining.

Cost of eleven of the tape-controlled units will be more than $3.3 million. The purchase is being funded from an Air Force Industrial Modernization Program designed to update manufacturing capability of the Air Force.

What's Included — In addition, Douglas is buying four numerically controlled machine tools as its part in the program.

The equipment, which will be installed in one of the West Coast plants of Douglas, includes: Seven Giddings & Lewis 5-axis profilers, three large Giddings & Lewis 3-axis DiMil profilers, two Giddings & Lewis 4-axis vertical turret lathes and four Sundstrand 4-axis Omnimils.

All the machine tools will be equipped with Bendix Dynapath solid state control systems.

Speed and Accuracy—Great production strides are possible with the tape-controlled units, Douglas reports. With a 5-axis profiler, for example, a 1000 lb forging can be reduced to a 90-lb missile component in 36 hours. Only two changes in position of the mill are needed to machine the front and the back side of the part.

Previously the operation would have required 400 hours. Eight different mills were needed, with transport of the part between machines, set-up time, and holding fixtures for each machine.

Five-Way Action—Giddings & Lewis describe the machines as "second-generation" units because they are "improvements on the original group of numerically controlled contouring machines."

Electric Machining Builders Sight Market Breakthrough

Two metal machining processes are rolling to a market breakthrough.

Electrical Discharge Machining (EDM) has been forging ahead. Right on its heels is Electrolytic Machining (ECM), showing even greater promise. By K. W. Bennett

■ Poised for a market breakthrough: Electrical and electrolytic machining of metals.

Neither process is new. But both are racking up remarkable sales gains in a two-year run that has been slow for most capital equipment.

Best known is Electric Discharge Machining (EDM). Coming hot on its heels is Electrolytic Machining (ECM). EDM uses high-density current (an electric discharge) to erode away unwanted metal from a metal workpieces. ECM bathes workpiece and metal in an electrolyte, a kind of metal electrolysis process.

Sales Leap—Biggest of the EDM equipment builders is Elox Corp. of Michigan. It reports sales in the past four months at 30 pct-plus over the same period a year ago. And Elox grossed $4 million in fiscal 1960, a 30 pct gain over the previous year.

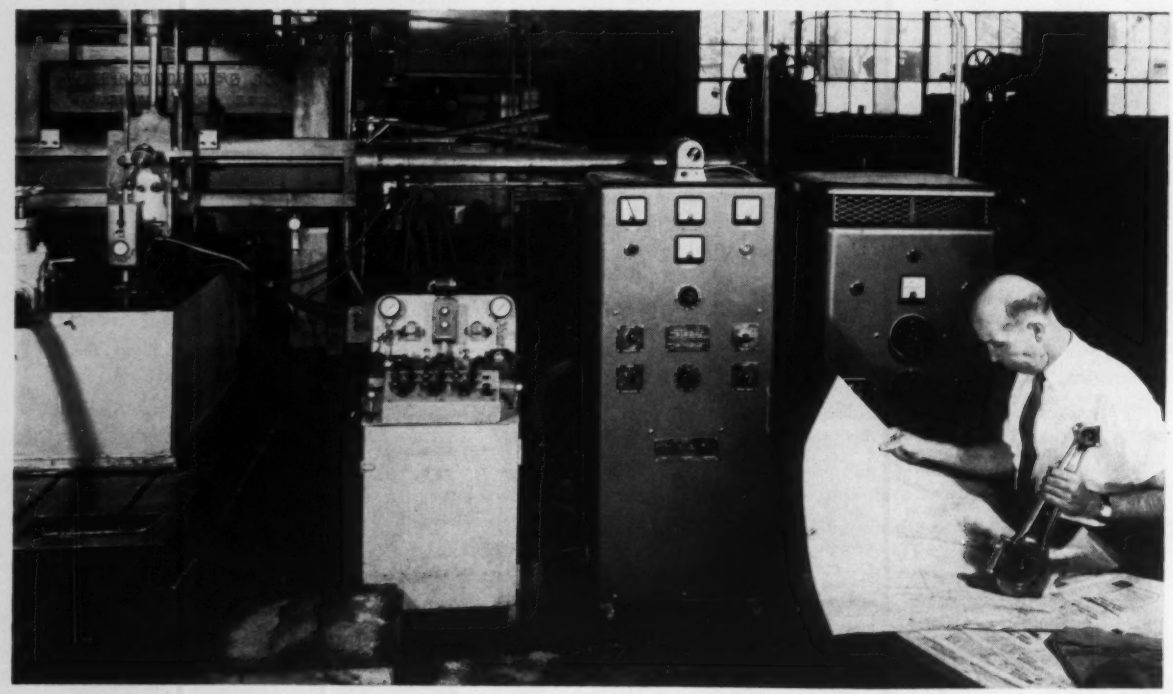
Easco Products Co., a fast stepping newcomer, hit $504,000 gross in 1960. It is on the way to $600,000 this year. With an eye on space race refractory metal needs, Easco will bet it can gross $2.5 million by 1963. It's breaking ground for a new plant at Chicago to meet anticipated demand.

Easy to Find—If there's argument over what EDM can or can't do, it's not because the equipment is hard to find.

At least 1500 EDM machines were in U. S. plants at the close of 1960. One estimate puts the 1963 figure at 3600. One manufacturer is at a one-per-day building rate. A newcomer is already at one-per-week.

The U. S. has six builders; Europe has 15, Japan two.

ECM Rate — Electro-chemical machining, ECM, has come up in a shorter time. It could achieve an even faster growth rate.



COMPLETE LAYOUT: Electric discharge machining unit produced by Easco Products Co. cuts die block for automotive connecting rod. EDM machines are widely used in Europe for this work.

Anocut Engineering Co., Chicago, is a leading producer. It indicates space race orders have doubled the company backlog in the past 60 days. Anocut will move to a newer, larger plant to meet the demand. The 1961 sales estimate is a 500 pct increase over last year.

There are about five producers of ECM equipment, including Hammond Machinery Builders, Inc. At least two large companies are expected to enter the field next year.

Erosion Gap—General Electric Co. is making extensive studies of electrode erosion, a problem that's dogged EDM sales.

Many potential EDM equipment users believe the electrode that fires the spark into a metal workpiece wears down at the same rate as the metal machined, a 1:1 ratio. This can happen. But a 20:1 ratio is entirely possible, or even 75:1 wear ratios favoring the electrode.

GE feels both electrode and machining techniques are advancing swiftly.

Shop Buyers—Tool and die shops are the big buyers of EDM equipment. Automotive and forge shops follow in that order.

The space race, with its need for tough parts in refractory metals, has touched off an additional market. National Aeronautics and Space Administration has four machines for its own use. Atomic Energy Commission has at least two.

Tungsten rocket nozzles, beryllium, and other "new" metals are hogged out on EDM and ECM machines. Another dawning market: Turbine buckets and blades, not only for aircraft, but large central power stations as well.

ECM Advantages—ECM appears to enjoy an advantage. It will rip out unwanted metal at rates up to 60 cu in. per hour, with almost no electrode wear. EDM uses considerable electric power, and usually operates at no more than 10-20 cu in. of metal removed per hour.

Some EDM men feel even the 20 cu in. figure is high. But companies familiar with both types of equipment warn the machine must be selected for the job—both have advantages.

With sales soaring, users of ECM and EDM equipment are still trying to decide how to use it best. Says a large job forger, "The biggest market for EDM is big shallow dies for heavy mass production—auto connecting rods where they run through a number of dies per week."

But he has four machines, two more on order, and is jobbing out work on another machine in a nearby tool and die shop. He makes dies, but also machines aircraft parts. And he is looking for more business in this field.

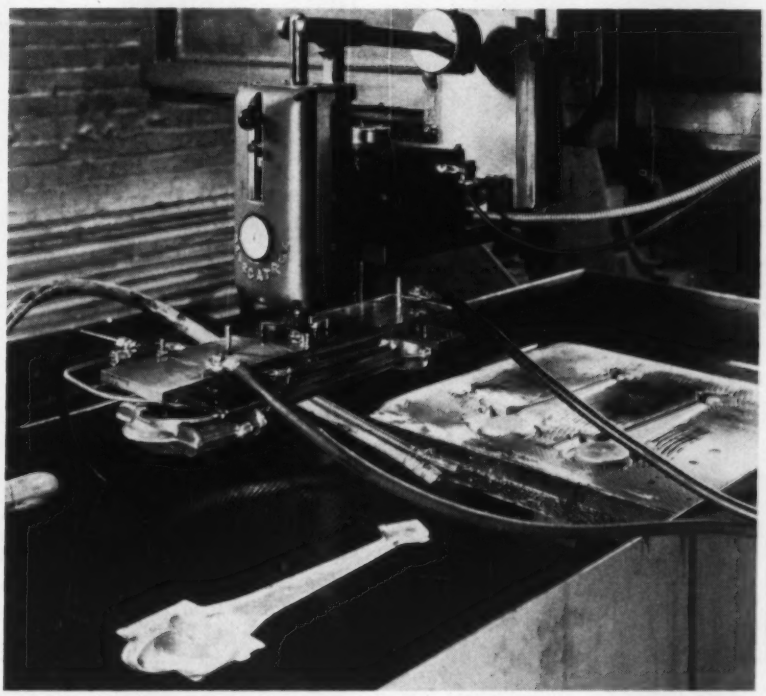
Special Tool — Comments one EDM builder, "This machine isn't for the tool and die shop. It could only be used in special applications."

Two other builders claim tool and die shops are their biggest customers. One predicts nine of every 10 die shops, in the next decade, will install EDM equipment.

Jobs that EDM is doing: A 12-cavity for a titanium hearing aid part; a 15-in.-deep forging die for power shovel teeth (EDM allows use of a one-piece, instead of a split die, multiplies die life by a factor of three); cutting 6-in.-deep holes in hafnium carbide, diesel crankshaft dies; cutting a forging die for a stainless steel wheel with 4-in.-deep flanges; cutting complex configurations in 1-in.-thick stainless steel honeycomb; finishing a 12-in. by 30-in. mold cavity for a rubber insulating housing; producing auto engine dies at 20 pct under previous cost.

Average backlog on EDM equipment is 19 weeks and rising. Indicative of the defense push, Anocut reports that 80 pct of new business in recent weeks has come from defense contracts.

Many producers still prefer caution. Said Sundstrand Machine Tool Co.'s F. A. Pitschke, "The inquiry rate picked up 60 days ago—from autos, forging, and aircraft. We feel we're at an early stage of the game, aimed for a really strong market try in 1962."



EDM CLOSEUP: Actual work on the die is shown in this business end of the Easco unit. Forge companies and auto plants are studying EDM.

Super-Tractor Era Is Here

And With It Comes New Markets for Builders

Heavy construction jobs, previously requiring blasting and drilling, are now being handled by heavy tractor equipment.

Tractor builders see a fast growing market. Already, sales are climbing.

By T. M. Rohan

▪ On the tiny Pacific island of Guam last year, a half dozen powerful crawler tractors tackled one of the toughest jobs ever tried.

Over 4.5 million cu.-yards of coral rock, tough as granite, had to be cleared in order to lengthen runways of an air base. Normally this is done by drilling and blasting. But this is a slow, costly and dangerous process.

Morrison-Knudson Co., Inc., the contractor, tried a new trick. A team of the most powerful crawler tractors made—425-hp Euclid TC-12s equipped with ripping blades—were moved in. And they did the job with relative ease.

New Era—The Guam project illustrates a new era in super-powered tractors. They are now opening up whole new areas of usefulness in the construction field. This is a big new market for heavy equipment builders. With their greater working ability, they can speed up the tedious shovel work formerly done by air hammers, drilling, blasting or by teams of smaller tractors.

The amount of power going into these new tractors is awesome. Within their low speed range, they have two and three times the drawbar pull of a locomotive. With a ripping blade, they can go through fissured granite one-ft deep. They will also rip through a coal seam five-ft deep and break up a five-ft thick frozen crust on Mesabi iron ore mines to speed up stripping during the winter.

Through ordinary soil, they have the power to dig a furrow seven-ft deep. Even with a bulldozer blade, they will move more than their own weight of material.

The Reason—"The big machines have come along rapidly in the last three years because they pay off in far higher productivity," says Alan S. McClimon, national accounts sales manager for Euclid Div. of General Motors Corp. "Much of this has been made possible by the development of the powershifting hydraulic transmission now used by six major manufacturers.

"With today's super tractors we can move 1000-cu.-yd per hour of material compared to about half that a few years ago. Tools are attached right on to the tractor now instead of being towed behind so that the weight of the tractor, plus hydraulic pressure, keeps them down. And we have the horsepower to move them.

"Together with other improved motor graders, scrapers and dump trucks, productivity has been so increased that excavation costs in terms of dollars per cubic yard for various materials have remained largely constant for the last 20 years."

Big Sales—In a good year this industry will have sales totaling $1 billion to $1.5 billion. Manufacturers have about emerged from under a large inventory built up for the federal highway building program. They're now more cautious.

TOUGH JOB: A super-tractor made by Euclid Div., General Motors Corp., plows up rock on a construction job in Oregon. Within their low-speed range, these tractors have three times the pulling power of a locomotive.

In line with the trend toward more powerful units, the industry leader, Caterpillar Tractor Co., with about 50 to 60 pct of the market, last month introduced a new crawler tractor. It's a 385 hp diesel model known as the D9G. It weighs 66,000 lbs. This series was started in 1955 at 300 hp and has been steadily beefed up.

Euclid has a three-year old twin-engine TC-12 which develops 425 hp, making it the most powerful built. This line has been continually upgraded too. Others close behind are Allis-Chalmers, and International Harvester.

Compact Models—Not all the emphasis is on size and power, however. Euclid recently introduced a "compact" scraper, the TS14. This is a 14 cu. yard capacity, 51,000 lb. scoop-type unit which will go up steeper grades faster. And it can be moved from job to job easier. It costs about $53,000 compared to the "big brother," a 24 cu. yd. model, costing $81,000 and weighing 70,000 lbs.

The heavier weights and tougher jobs being done require specialty steels in most cases. Ripping blades made by Gar Wood Industries at Findlay, O., are of high tensile steel to withstand pressures of 35,000 lbs. per tooth. Teeth themselves last only a few hours in hard ripping and turn any moisture in the ground to steam. Ripping blade assemblies weigh 16,000 lbs. And teeth can be extended 7 ft. deep.

Tractors are, of course, the heart of construction equipment because of the wide variety of jobs they must do. But weight is desirable for better traction. So, not too much high strength steel is used.

In allied equipment like scrapers and trucks, however, greater payload is money in the bank and high strength steels are frequently standard. The operator will pay the premium and get it back in increased payload in a few months. In dump trucks, capacity of one unit was raised from 55 to 62 tons through substitution of high strength steel. Another went from 40 to 45 tons.

Japan Readies Rival For Can Market

The hot battle between tinplate and aluminum for the metal can market soon will get a new combatant from Japan.

Fuji Iron & Steel Co. will be in production with a chrome-plated can stock sometime this fall.
By H. R. Neal

■ Sometime this fall a new 36-in. continuous strip plating line will be placed in operation by Japan's Fuji Iron and Steel Co. Ltd.

If the product is as good as Fuji says, it will mark the opening wedge for the entrance of another metal product into the hot battle for the container market.

The Japanese steelmaker's new product is chrome-plated steel strip. It's continuously coated with chromium to a thickness of about 0.004 mil. In commercial production, Fuji believes "a reduction of 10 pct in cost can be realized as compared with that of tinplate."

Exclusive Report—In an exclusive report to The IRON AGE, Fuji said the new product is aimed at the metal can market, primarily as a replacement for tinplate. Main use will be as a food container and packaging of other products such as motor oils and other lubricants, beer, milk, and just about anything else that now goes into cans or aluminum containers.

In addition, the company says it could also be used to make toys and other products in which thin-gage steel sheets are used. Another use: As a base metal for plastic film laminated sheets such as polyvinylchloride because of "its resistance to chemical attack and its superior adhesive quality."

Advantages Claimed—Fuji claims the chrome plate is superior to tinplate in a number of areas. Among them: Better formability and drawing properties; greater resistance to corrosion caused by acid, alkali or salt water when treated with appropriate coating materials; resistance to discolorations caused by sulphur-containing proteins.

It isn't limited to low-range temperatures in the baking of coating materials because of chromium's higher melting point, thus cutting baking time from about 20 minutes down to one minute; and weldability is as good as cold-rolled strip and it can be spot-welded or seam-welded with little oxidation or bluing around the weld; and superior adhesion characteristics make it easier to select a suitable coating material.

Put to the Test—Fuji says the chrome-plated can stock has been under test for several years. Quantities of the material were supplied to Japanese canmakers who ran it through their regular lines.

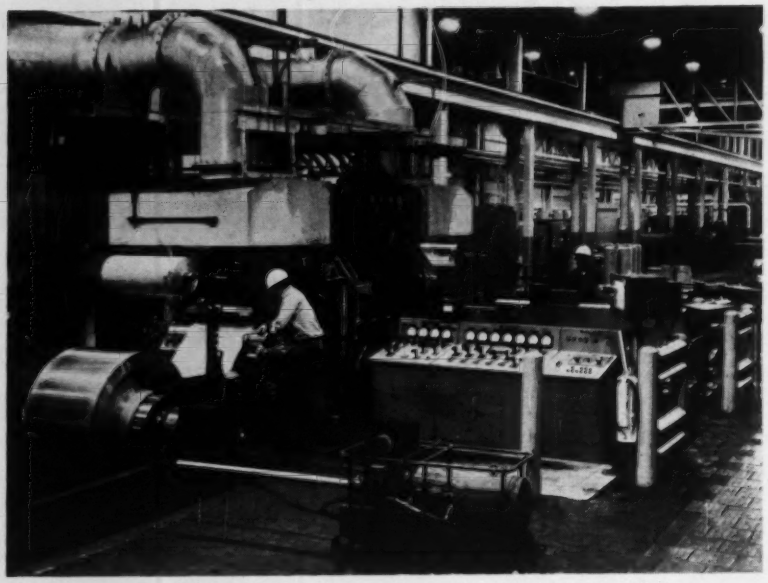
U. S. canmakers interested in the chrome-plated stock include both American Can Co. and Continental Can Co. But they are withholding judgment until they receive sample shipments.

Time Will Tell—A representative of one American canmaker says his company has heard reports that the chrome-plated stock presents soldering problems "and that would knock out two-thirds of our uses," he said. But it could be used for can ends or non-soldered containers.

U. S. steelmakers are interested in the chrome-plated can stock, too. But they still lack the needed information to evaluate it.

Meanwhile, Fuji says it hopes to export to the U. S.—but only after it meets demand from Japanese canners and canmakers. The company has applied for U. S. patents.

Armco Mill for Space Age Stainless



EXPANDED CAPACITY: This Sendzimir mill for cold reduction of chromium-nickel and other grades of hard alloy steel strip is in operation at new Armco Steel Corp. stainless plant at Butler, Pa. It's part of a recently completed $80 million expansion program at the Butler Works.

New Life Expected For Eximbank

Legislation extending the life of the Export-Import Bank for another five years is headed for enactment.

The law would not only keep the Eximbank going, but would give it increased powers in the loan guarantee field. The bank would be authorized to issue short-term credit guarantees or insurance to U. S. exporters for political as well as commercial risks.

FTC Still Pushing For Faster Work

The Federal Trade Commission continues to push for speedups in handling of business cases. FTC is taking both legislative and administrative action to expedite cases.

Latest legislative move: A push to get authority to issue temporary cease and desist injunctions simultaneously with complaints. Industry argues that this authority would keep a businessman from engaging in certain trade practices even though it had not been proved the practices violate the law.

On the administrative side, FTC now allows small businessmen to file complaints of unfair trade practices through field offices of the Small Business Administration. Under the desired plan, complaints would be filed at the FTC itself.

Packer Absorbs Freight On Some Can Shipments

Pasco Packing Co. of Dade City, Fla., has notified customers it will absorb freight on canned citrus shipments not in all-aluminum cans.

The second largest citrus packer and largest of private label cans, Pasco will pay the difference between the all-aluminum and tinplate or combination cans. According to aluminum companies, this comes to 75 cents per 1000 with thin tinplate and about 35 cents with the combination tinplate-aluminum can.

Other packers are said to be following Pasco's lead. Aluminum people say the move will work in their favor. They say it gives the packer a new economic incentive to use all aluminum. They say the amount involved more than offsets the savings represented by the lighter tinplate coatings.

Pasco ships about 250 million cans a year. Total citrus can shipments are close to 2 billion. The freight absorption step is explained as a move to retain control of materials selection in the citrus field.

U. S. Beryllium Corp. Acquires New Mine

U. S. Beryllium Corp. has acquired the California Mine, on Mount Antero, Calif., one of the nation's earliest recognized sources of beryllium ore.

Both the California mine and the California group of claims were leased from G. G. Furman, of El Paso, Texas, on a 5 pct royalty.

The move materially enhances U. S. Beryllium's ore resources, according to Don H. Peaker, Beryllium's president.

The ores are within convenient hauling range of a new concentrating plant being built on Badger Flats by Mineral Concentrates and Chemical Co., (Mincon), of Denver.

GE Will Expand Output Of Refractory Metals

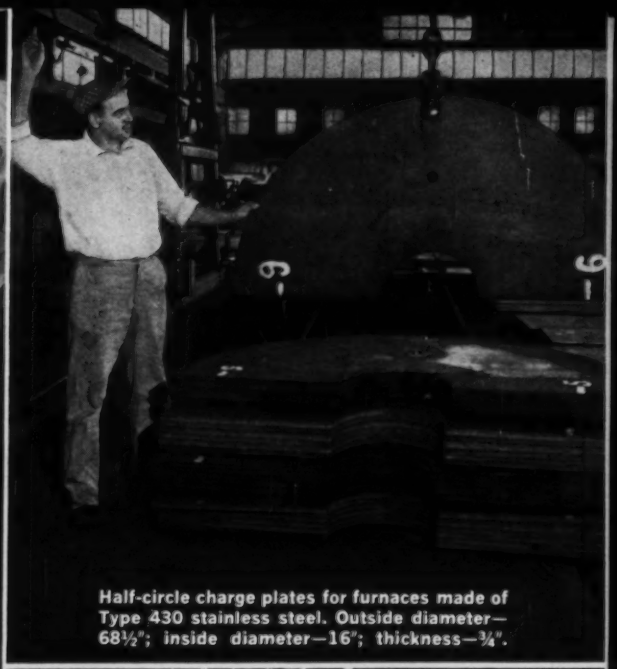
New hot rolling mills are being installed at General Electric Co.'s new Euclid, Ohio, plant to expand the company's output of certain refractory metals in wide sheet form.

First of the hot rolling mills will be in use by October for production of wide sheets of tungsten and molybdenum. It will be capable of producing 24-in. wide tungsten sheet and plate in thicknesses of 0.500-in. to 0.150-in.

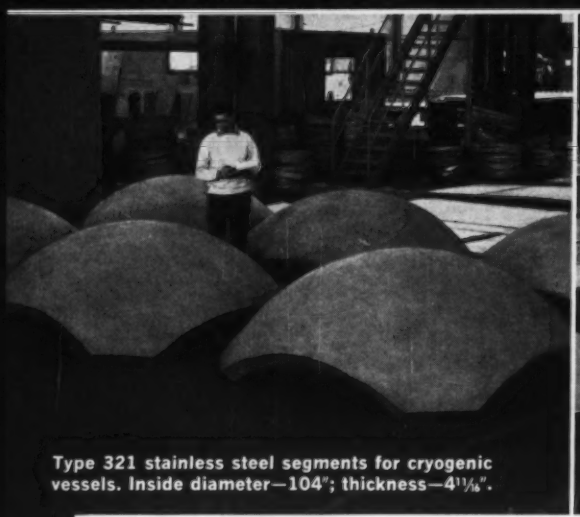
A second mill, which will be in operation before the end of this year, will be used for finishing at lesser thicknesses. Eventually, products in thickness to 0.005-in. will be produced.

GE expects that tungsten and other refractory metals in wide sheet form will serve increasing needs in missile and space applications where strength is required.

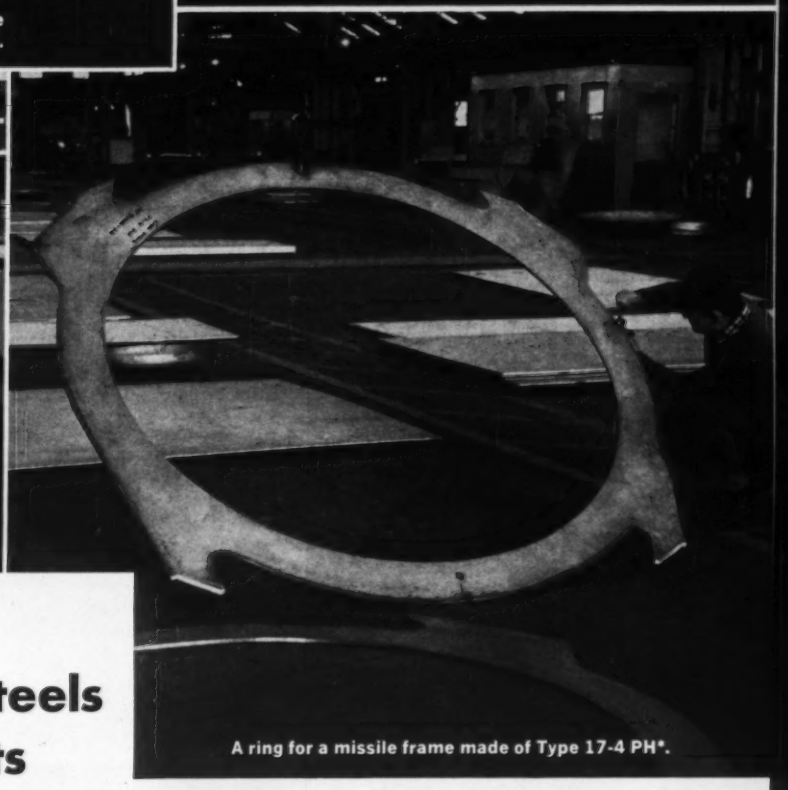
Indexing plate for nuclear storage cask. Type 304. Outside diameter—44⅜"; thickness—2¾".



Half-circle charge plates for furnaces made of Type 430 stainless steel. Outside diameter—68½"; inside diameter—16"; thickness—¾".



Type 321 stainless steel segments for cryogenic vessels. Inside diameter—104"; thickness—4¹¹⁄₁₆".



A ring for a missile frame made of Type 17-4 PH*.

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INDUSTRIAL BRIEFS

Chemical Change—Dubois Chemicals of Canada Ltd. has moved general offices and manufacturing facilities to a new plant at Weston, Ont. It will produce institutional and industrial sanitation, maintenance, and processing compounds.

Bigger Stock—Cleveland Graphite Bronze Div., Clevite Corp., is expanding and consolidating its Cleveland warehouse facilities. A new, enlarged warehouse on St. Clair Avenue will be used for bearing stocks and replacement parts.

Growing South—Republic Steel Corp. is opening a new district sales office at Atlanta.

Chicago Branch — Towmotor Corp., Cleveland, has opened a new factory sales and service branch at Chicago for materials handling equipment.

IMPORTANT SAVINGS

Lower initial cost
Long life
Ultra high quality

Small Diameter
ROLLS

Special alloys with tough, fine-grained finish. Surfaces as fine as 3 micro inches RMS. Chrome plating available.

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Rolls reconditioned like new at costs averaging 25% of new rolls. Rolls can be reconditioned several times!

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Cable Contract — Beryllium Corp., Reading, Pa., has received a contract in excess of $1 million from Western Electric Co., Inc. It is for beryllium copper casings and couplings for a new type submarine telephone cable system.

New Department — American Vinyl Corp. has formed a Design Engineering Dept. It will operate on an international basis, helping manufacturers to develop new custom and standard vinyl extrusion products.

Piping Pact — Midwest Piping Div., Crane Co., received a $5 million contract from Pacific Gas & Electric Co. to fabricate and erect all piping for new units at the Morro Bay, Calif., power plant.

Reactor Share — Allis-Chalmers Manufacturing Co., Milwaukee, has received a $341,700 AEC contract, through Union Carbide Nuclear Co. It will make the reactor vessel for the new $12 million High Flux Isotope Reactor being built at Oak Ridge National Laboratory.

Battery Award—Electric Storage Battery Co., Philadelphia, has received a $7.5 million U. S. Navy contract for submarine batteries. It is the largest single Navy sub battery order ever placed with a single supplier in peacetime.

Philippines Plant—Koppers International, C.A., has received a contract from Acoje Mining Co., Manila. It will build a ferrochrome plant on the Island of Mindanao, The Philippines. The plant will use the Strategic-Udy direct reduction process, under license from Strategic Materials Corp., N. Y.

Now Casting—National Lead Co. has started production at its new die casting plant at Boulogne, Argentina. It will manufacture die castings for Argentina's expanding automotive industry, as well as die cast components for appliances.

Westward Show—F. J. Stokes Corp., Philadelphia, has opened a new West Coast facility at Pasadena, Calif. It will distribute equipment for vacuum processing, molding, tabletting and compacting.

Cash Deal — Stewart-Warner Corp., Chicago, has acquired for cash the Aero Div., Cornelius Co., with headquarters and plant at Minneapolis. Aero will continue to make air compressor equipment and high performance hydraulic devices.

Plastic Purchase—Eberly Dynamics, Inc., has purchased Protective Plastic Co., Bedford, O. Protective will continue to make fiberglass reinforced plastic ducts.

Another Buy—Thermal Ceramics Industries, Inc., Denver, has acquired another company in its expansion program. The new addition is Brazil Hollow Brick & Tile Co., Brazil, Ind., which has been renamed Denver Fire Clay Co. of Indiana, Inc. It makes multiple channel conduit and hollow tile pipe.

Screw Sale—Bowman Products Co., Cleveland, has acquired Spirex Screw Co., Inc., Akron, O. Spirex will continue to make fasteners for industry and construction.

Eastern Growth—Eastern Co. of Connecticut has purchased Thompson Materials Corp., Belleville, N. J., a supplier of specialty products for highway and heavy building.

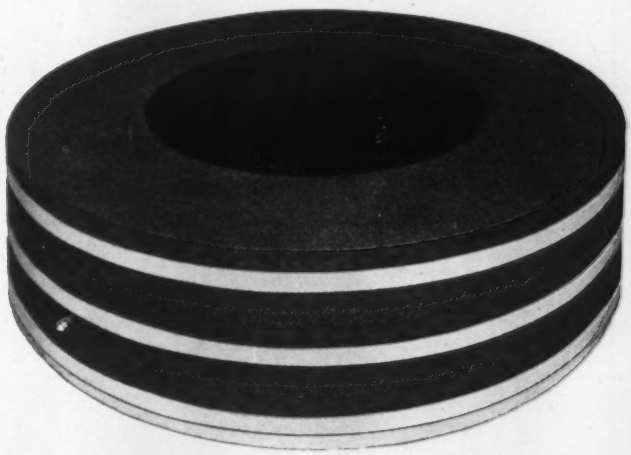
Canadian Arm—Hills-McCanna Co., Carpentersville, Ill., has formed Hills-McCanna (Canada) Ltd. with headquarters in Toronto. It will make and market ball valves, diaphragm valves and chemical proportioning pumps for Canada.

New Entry—Welding Products Corp. has been formed at Mt. Vernon, N. Y. It will make and distribute welding cable, hose, safety equipment and related items.

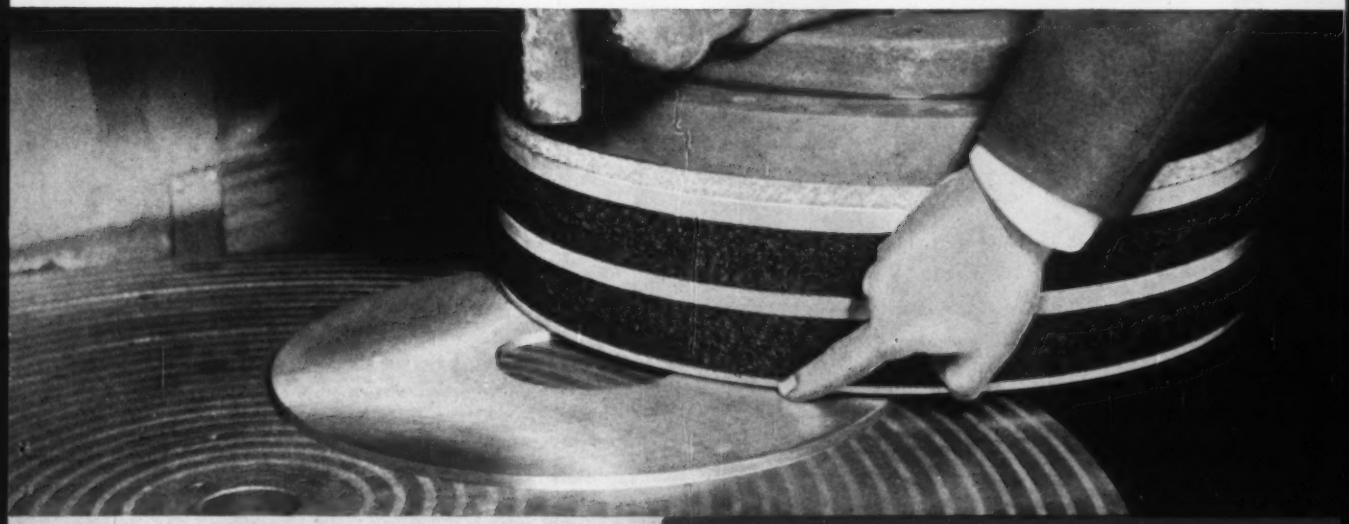
Midwest Office — Anti-Corrosive Metal Products Co., Castleton-on-Hudson, N. Y., has formed a Midwest field office at 8230 Lehigh Avenue, Morton Grove, Ill. It will stock corrosion-resistant fasteners.

GARDNER TAPE BOUND WHEELS ELIMINATE DOWN TIME

- **Glass fibre tapes remain on wheel until ground away . . . no production stoppages for cutting and removal**

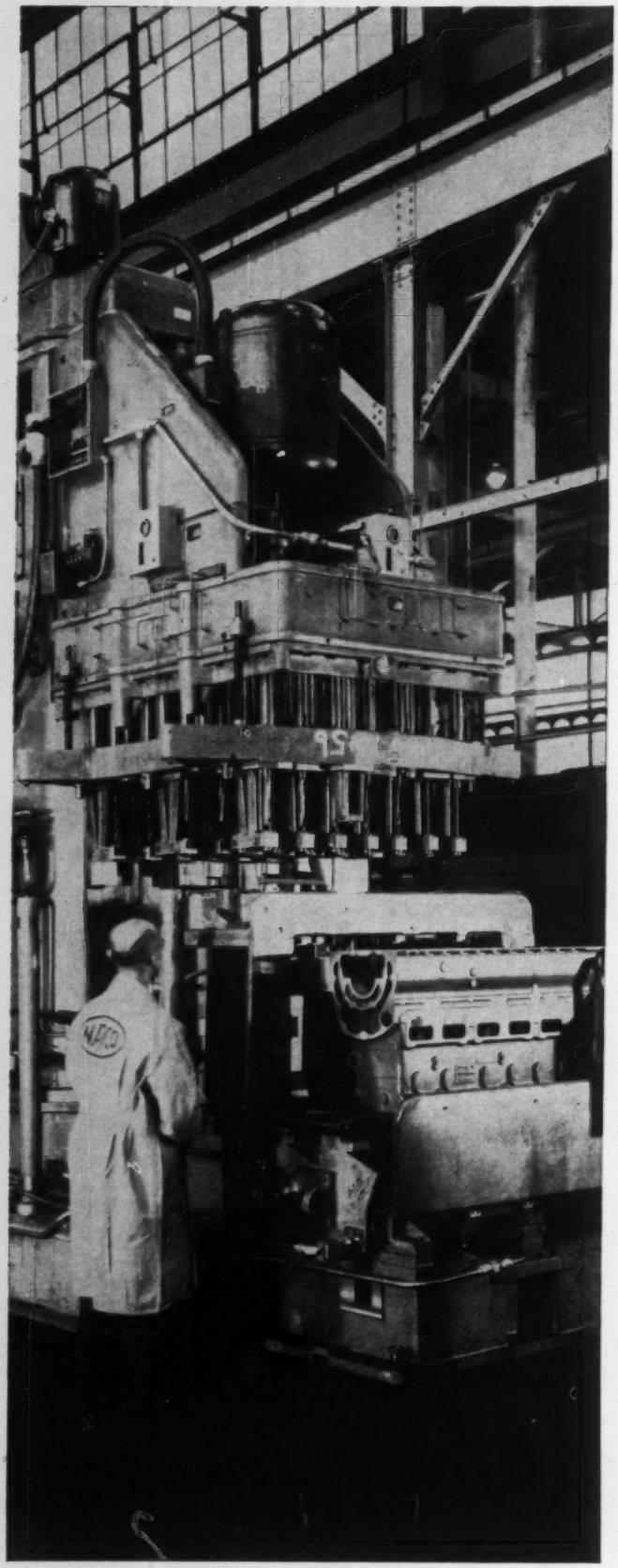


Gardner tape bound wheels now provide continuous, uninterrupted production by eliminating the need for costly stoppages to cut and remove wire binding.



GARDNER

GARDNER MACHINE COMPANY, BELOIT, WISC.

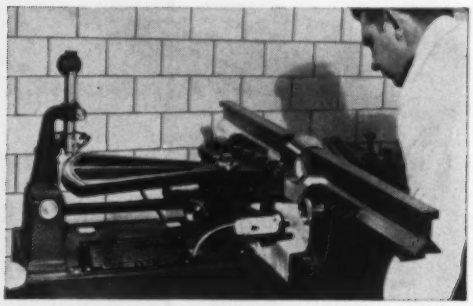


How NATCO'S 87 spindles stay accurate

When National Automatic Tool Company designed this Model C5A-129 machine that drills, reams and counterbores, they had some tough problems. One was long-lasting accuracy for the 87 spindles requiring 174 bearings. The bearings used would have to assure accuracy under heavy loads at high speeds. And space limitations demanded that the bearings have maximum radial and thrust capacity in minimum space.

With the help of Timken Company engineers NATCO designers were able to select from the many types and sizes of Timken® tapered roller bearings, the one exactly suited for the job. The flanged cups of the 174 Timken bearings selected for the 87 spindles allowed shorter housings, through-boring for accurate alignment and saved space.

Spindle rigidity and accuracy are assured because the taper of Timken bearings lets them take *any* combination of radial and thrust loads. Full-line contact between their rollers and races provides extra load-carrying capacity.



TOP BEARING ACCURACY is assured because of our gage lab, the industry's finest. Some instruments we use measure even the thickness of several molecules, or split a hair 30,000 times.

The Timken Roller Bearing Company, Canton 6, Ohio. Cable: "TIMROSCO". Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits. Canadian Division: Canadian Timken, St. Thomas, Ontario.

Industry rolls on

TIMKEN®

tapered roller bearings

Consumer Forecasts Are Tougher

Accurate analysis of consumer buying trends is getting more difficult.

Reason: Previous patterns of behavior are not always holding up. Spending plans are not as easy to estimate.

▪ Predicting what the consumer will do isn't easy. At least, it isn't as easy as it used to be.

Business plans are based, to a great degree, on projections of consumer spending. They have to be when consumer buying accounts for about two-thirds of total demand.

Formerly the pattern of consumer action was easy to predict. Buying fell off in times of recession. The main exception was housing where demand moved against the general trend (countercyclically).

The general pattern still holds true. But its outlines are harder to trace. And, in some cases, the trends are changing.

New Housing Pattern — Take housing, for example. When the 1960 recession took hold, housing was one of the areas which might have reversed or at least cushioned the downturn. But this did not happen.

Data compiled by the Federal Reserve Bank of Cleveland shows that in each postwar recession, housing starts have apparently had less countercyclical influence.

Says the Bank: "It's apparent the housing industry has provided progressively less of a countercyclical stimulus to the economy in each of the four postwar recessions."

Retail Sales Studied—This is not the only area where consumer trends are harder to predict. Another study, this by the Federal Reserve Bank of Chicago, discusses the influence of consumer spending on the current recovery.

It's pointed out retail sales are only a part of total consumer spending. Services—including rent, medical care, recreation, and education —amount to a growing portion of all consumer spending. Currently they are about 40 pct. of the total.

This area of spending showed only a mild dip in the last recession. And this year the gain in services and buying of nondurables more than offset a dip in outlays for durables, producing a slight gain in total consumer spending.

Accurate Indicator—It's suggested that retail sales may not be an adequate indicator of changes in consumer spending. "Uncertainty on the outlook in this sector," says the Bank, "may partly reflect buoyancy in the prospects for spending on travel, personal care, education, entertainment, home purchases—transactions included only in part among retail sales."

How to Bawl Out an Employee

▪ Properly bawling out a subordinate is an art.

This is the belief of Dr. George S. Odiorne of the University of Michigan's Bureau of Industrial Relations.

In his book, "How Managers Make Things Happen," he outlines seven "deadly sins" to avoid in chewing out an employee. They are:

Failing to get the facts. "Be sure you have all the facts before leaping. Don't accept hearsay evidence, or go on general impressions."

Acting while angry. "Be calm in your own mind, and as objective as possible in making a decision to reprimand."

Keeping the employee in the dark on the exact offense. "Let the person know the general charge, and the specific details of the offense."

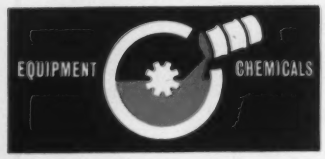
Neglecting to get the other person's side of the story. "Allow the employee to give his full say about what happened and the reason why he did what he did."

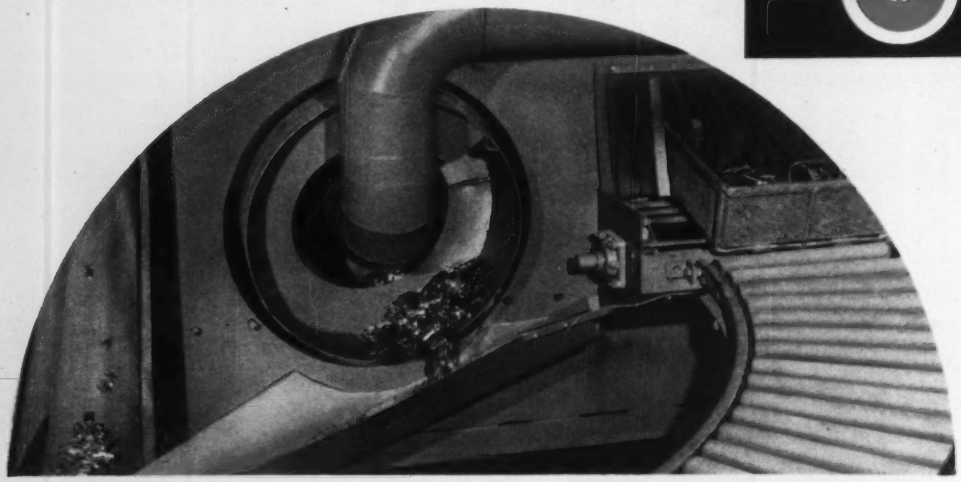
Failing to keep records. "Reprimands should always be recorded in the personnel folder of employees."

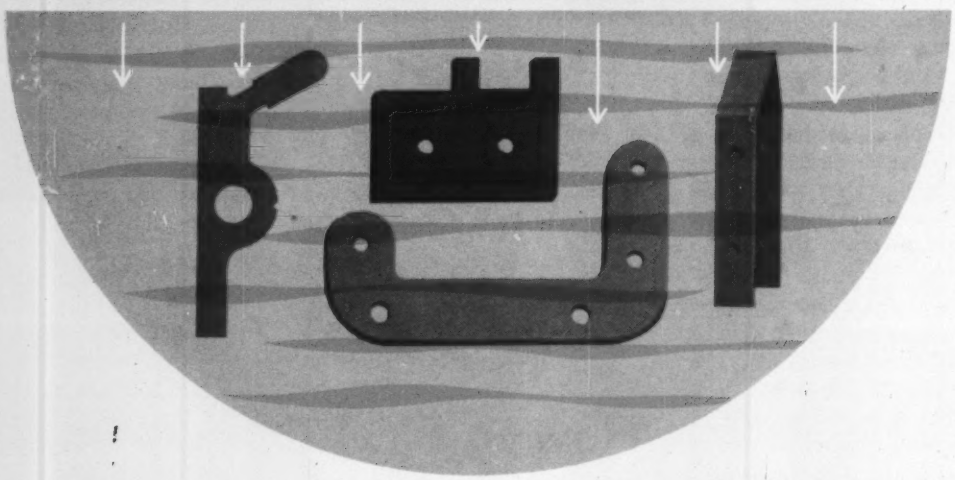
Harboring a grudge. "Don't carry a hostile attitude forever after. Assume you are starting with a clean slate and let the employee know you consider it a thing of the past."

Backing down when you are right. "Compromise and understanding are virtues but once you've decided and announced your decision it's a mistake to relent."

Pennsalt System Approach for better cleaning







SWITCHGEAR RELAY PARTS CLEANED BETTER

with Pennsalt equipment-chemical team

By turning to Pennsalt for both cleaning equipment and chemicals, the General Electric Low Voltage Switchgear Department in Philadelphia brought new efficiency and product quality to cleaning precision parts used in protective relays for electrical systems.

The machine. A combination Pennsalt drum-belt washer produces "excellent results" on in-plant cleaning of parts. Small parts and contacts are automatically soaked, washed, rinsed and dried in the drum section; larger parts in tote trays receive a spray wash, rinse and hot air drying cycle on the belt side.

The materials. On the basis of our lab evaluation of actual soils and parts to be treated, we selected the Pennsalt cleaners best suited for this job in this Pennsalt equipment: Pennsalt Cleaner 30, an alkaline material that gives fast, effective spray or soak cleaning; and Pennsalt Cleaner EC-54, a speedy, emulsion cleaner that does not boil off or evaporate at high temperatures.

Pennsalt System Approach. Teamwork of Pennsalt chemicals and equipment for metal treatment gives you best finishing at lowest cost. Because we make both, we can make them work together at peak efficiency. And we live with your production line month after month. Work-together combinations of materials and machines from Pennsalt cover a broad range of cleaning, phosphating, drawing lubrication and pickling operations.

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In-Between Chevy Is a Chevy II

So there's no mistaking the family ties, Chevrolet's new car will be called Chevy II.

It's larger than the compacts, but it isn't quite as large as Ford's new in-between models.
By A. E. Fleming

■ Size of the Chevy II, Chevrolet's in-between car, should give speculators something to think about. The car is only three in. longer and 3.8 in. wider than the Corvair. Chevrolet general manager E. N. Cole says, "The highly functional design of the entire car (Chevy II) allows maximum conversion of exterior size to interior roominess."

The only thing is—Ford Motor Co.'s in-between cars are quite a bit bigger on the outside.

Up to the Buyers—This brings up a question: Will the public buy the small size or king size version of the middle-size car?

Chevy II is 183 in. long. The Corvair is 180 in. long. Ford's Fairlane is 197 in. long. And Mercury's Meteor is 203.8 in. long.

Exterior dimensions alone indicate Chevrolet will have a cost advantage over Ford in producing its in-between car. If this edge shows up at the retail level, it would probably have an important effect on sales.

Single-Leaf Spring—Aside from size, an interesting feature of the Chevy II is the single-leaf spring used for the rear suspension. Made of chrome steel from rectangular bar stock, the springs are specially rolled and worked to provide an unusual design.

They are five ft long and vary in thickness and width. They are mounted in heavy rubber insulators and are much lighter than multi-leaf or coil springs.

Heaters are Standard — Among other 1962 Chevrolet highlights: Heaters are standard equipment on all cars; an ornamental grille for Corvair; optional bucket seats in the Monza stationwagon; a redesigned Powerglide transmission; two new inline engines for Chevy II, a 120-hp six-cylinder, and a 90-hp four-cylinder.

In trucks, Chevrolet will offer its first diesel—a four-cylinder, 130 hp model. A V-6 diesel will be added later.

Pontiac Adds Glitter

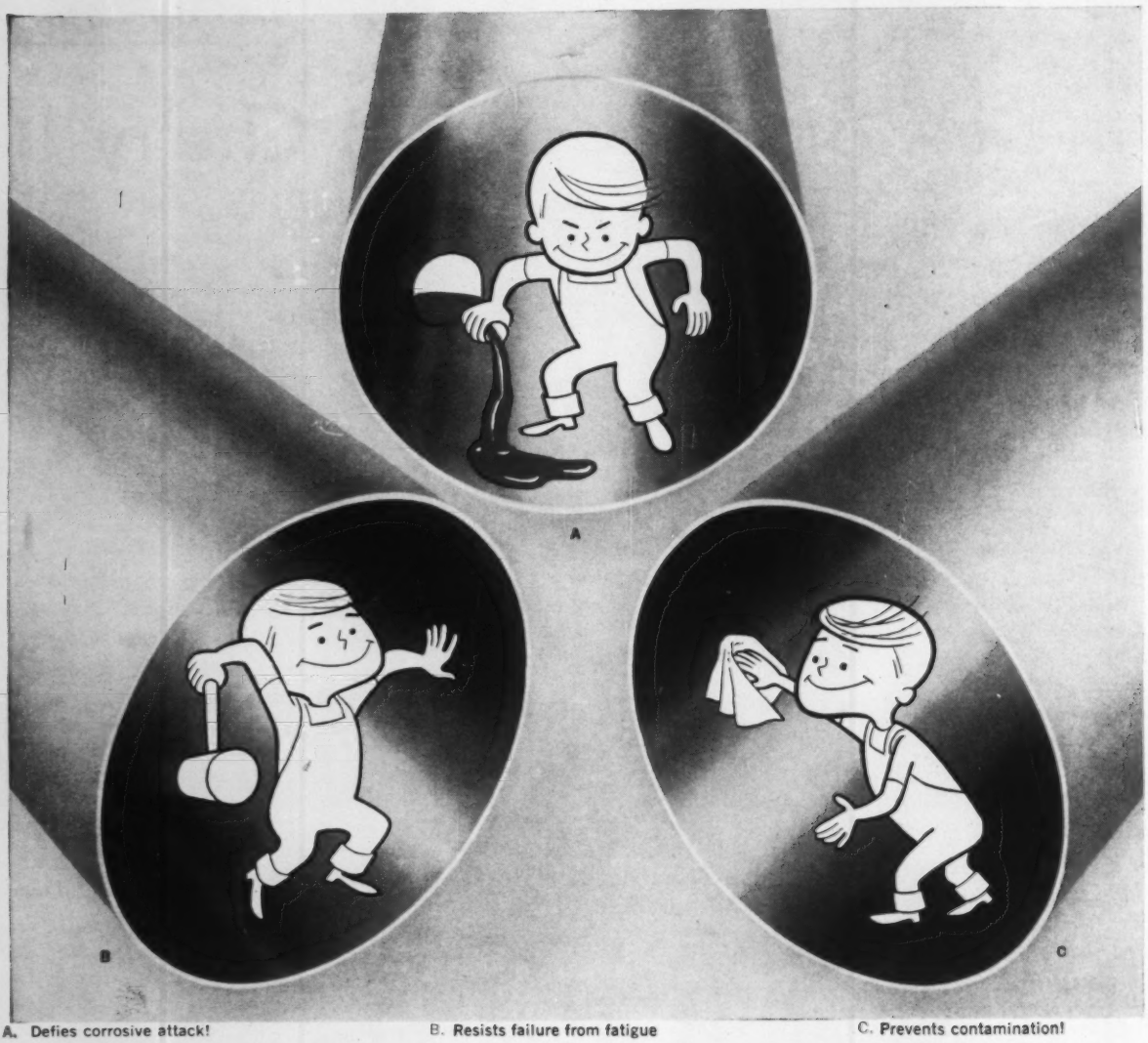
Pontiac's expanding its compact Tempest line for 1962. It's adding a convertible in both the standard and luxury series, the latter with bucket seats and a fancy name—Le Mans.

The expanded line fits in with Pontiac general manager S. E. Knudsen's belief that the Tempest will account for a bigger slice of the division's output in 1962. During the 1961 model run, the compact accounted for 100,783 of the 340,635 units made by Pontiac.

Pontiac's going after the piazz buyer with its regular medium-price line, too. A bucket seat, personal-type model called the Grand Prix is aimed at grabbing some of the thunder from Ford's Thunderbird. At the same time, it's dropping the Ventura series.

Artist Depicts Rare Bird—a Cardinal

BIRDWATCHING: Artist's drawing shows Ford Motor Co.'s forthcoming small car, the Cardinal. Not yet in production, the front-wheel drive car is designed to compete with the economy imports, will sell for about $1550, says Mechanix Illustrated magazine in its latest issue.



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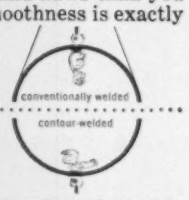
Feel the inside surface of a Contour-welded* stainless tube. It's so smooth you barely feel the weld. Even with a microscope you see fewer crevices and flaws than you find in other makes of tubing. This smoothness is exactly the reason why Contour-welded tubing is so resistant to corrosive attack...to product incrustation ...and to failure from fatigue.



Contour-welded tubing is smoother than other tubing, welded or seamless, because it's welded at the bottom. Gravity pulls the metal down so that the weld corresponds to the inside contour of the tube. There's no bulge on the inside surface. Even on the outside surface, the seam closely conforms to the tubing shape.

Just the opposite occurs in conventionally-welded tubings. There, gravity pulls the molten metal down into the tube. This can form a bead that is difficult to remove by cold working. And cold working can lead to undercuts that become focal points for corrosive attack, incrustation, and even failure from fatigue.

Contour-welded tubing is smoother than seamless. That's because it's formed from uniformly rolled strip steel, whereas seamless must be produced by extruding or piercing.

But get the full story. Write today for our free 48-page manual, which describes tubing sizes from 1/8" to 40" O.D., in stainless and high alloy steels, titanium, zirconium, zircalloy, and Hastelloy**.

*Trent's patented process — U.S. Patent 2,716,692

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Computer Market Grows in West

Aerospace Management Combines Minds and Machines

The complex aerospace industry offers a fast-growing market for high-speed computers.

Every day managers find greater use for them as aids in decision making.
By R. R. Kay

■ Where's the country's biggest computer market? Best estimate: Southern California and Arizona.

The region absorbs 20 pct of U. S. annual sales and rentals which run several billion dollars. It's also developing as a computer manufacturing center. One company, Thompson Ramo Wooldridge Computers Co., so far this year tripled its sales over the same 1960 period.

Farwesterners will take an even bigger share of the national market in the next few years.

Behind the Demand — The big bulk of orders will come from the aerospace companies. They're using more and more computers. Managers need them. Every day, the computer takes a greater hand in aerospace decision making.

Behind this need are two factors: 1. The technological explosion which produces vast amounts of complex information; and 2. space age economics—demands from Congress, the White House, and the Pentagon for greater cost-consciousness.

Key Team — The aerospace industry sees the manager-computer team as the answer. It's the key to short and long-range planning as well as control of going projects.

Prompt delivery of the Polaris submarine - launched missile points up how computers help management to attain the goals of speed and accuracy. So says William T. Mason. He's from the Navy Dept.'s Special Projects Office.

Nothing Overlooked—Mr. Mason feels management's challenge in the space age is to overcome and enslave the complex detail needed for fast and accurate decisions. The big job is to keep up with the status of a vast number of parts and pieces and not get swallowed up in detail.

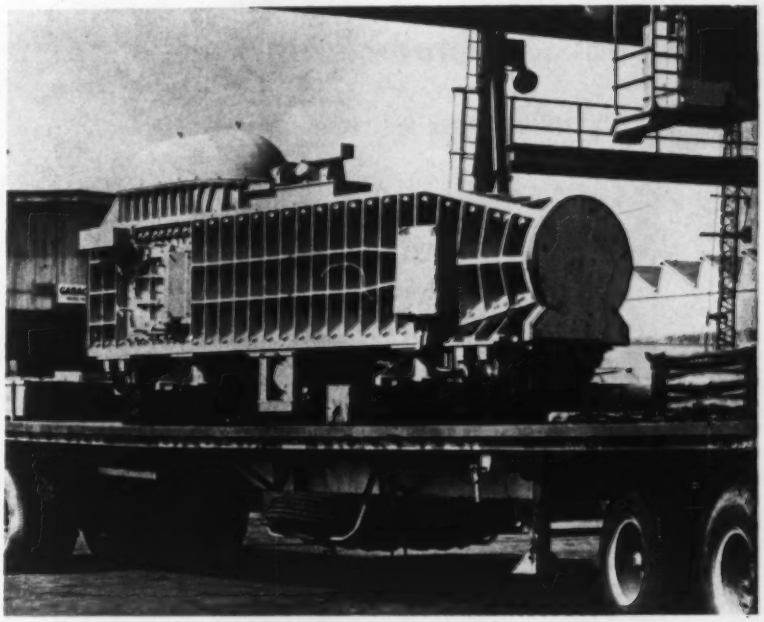
The space age manager must be positive that a million parts are examined — not a single one overlooked. The computer can organize the facts which he must have to make decisions.

The U. S. Air Force, too, has an ambitious computer project underway. It's developing a streamlined scientific management program. The aim: To give the Air Force Logistics Command and the aerospace industry control over development of more than 100 weapons systems.

Quick Answers — The program's purpose is to give quick answers to questions at all levels of management, from USAF headquarters through prime and subcontractors.

It features a real advance in the use of computers as aids to management. The computer stores data for use in making estimates of management problems.

Wind Tunnel Moves From West to East



WIND MOVEMENT: Nozzle and test section for a wind tunnel leaves U. S. Steel's Consolidated Western Div. It will become part of NASA's continuous-flow hypersonic tunnel at Langley Air Force Base, Va. It will be capable of creating a flow of air 10 times the speed of sound.

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NICHOLSON

What Machine Tool Orders Show

Industry Abroad Tooling Up Faster Than U. S.

High export sales show industry abroad may be tooling up faster than in the U. S.

Tool builders also have second thoughts about Administration's depreciation proposal.
By R. H. Eshelman

■ Machine tool activity in the summer months is rocking along at about the same modest levels established over the past few years. The total of net new orders of about $56 million represents some decline from June. But the summer slump, when many builders close for vacations, appears less than usual.

Again, strength of foreign orders continues to amaze. In metal cutting types, foreign new orders came to almost $19 million, compared to domestic new orders of $28 million. Foreign new orders in presses (forming tools) came to $2 million against a domestic figure of $7.250 million. In the overall picture for the first seven months, foreign orders total $118 million against $269 million, a healthy third of the total market.

The Significance — Executives throughout the industry are studying these trends closely. Says one special machine builder's director of sales, "The true significance of these figures is that American builders are just not tooling like their foreign competition." He further points out that virtually every export manufacturer abroad, from West Germany through Britain, and the Far East is trying to keep ahead of their world competition.

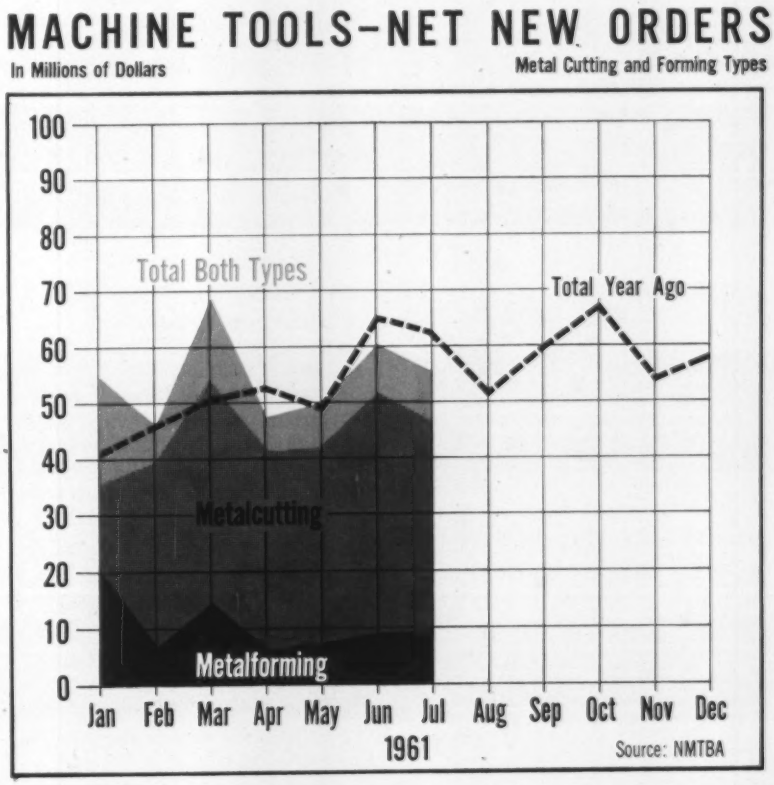
"They are tooling for automation in a big way, both to meet the growing labor shortage and to stay out front," he declares. On the other hand, these experts feel American industry must be falling further and further behind.

Second Thoughts — Some key machine tool executives, from New England through the Midwest, are saying privately that industry's opposition to the administration depreciation proposal may have been premature. Not only did the plan die in committee, but many are now wondering how much modernization business it cost them this year.

"We may get nothing, now or next year from Congress," said one ruefully. Another observed that many machine tool people had been inclined to go along with this proposal as a first step in depreciation reform, and hope for revision.

What It Cost—One company president: "Killing off of this plan cost us about $80,000 depreciation allowance in our own plant this year." He admitted this might not be typical, but wondered aloud what volume of machine tool modernization business went down the drain when the tax committee voted down the bill. "Instead of a boom in the tool business in the last quarter, now the best we can look for is a slight increase," he says.

In the press field, the picture is about the same. A slight pickup is expected this fall, but not much.



MEN IN METALWORKING

R. M. Russell, elected president, Acoustica Associates, Inc.

J. T. Timmins, elected president, Chromium Mining & Smelting Corp.

D. S. Myers, named vice president, Amsler Morton Co.

Matthews Corp.—George Friedl, Jr., elected chairman of the board and chief executive officer.

Michigan Plating & Stamping Co.—J. H. DeVries, named president.

Geigy Chemical Corp.—C. A. Suter, elected president.

Valk Manufacturing Co.—J. H. Hippensteel, appointed vice president and general manager, Pell City, Ala., plant.

McGill Manufacturing Co.—A. B. Williamson, named vice president and general manager, Bearing Div.

Miniature Precision Bearings, Inc. — D. D. Davis, elected vice president and secretary-treasurer; R. E. Gengenbach, elected vice president and general manager, SBB Div.; A. van Breems, elected vice president and director, international operations.

Industrial Plants Corp. — R. S. Botwinik, elected vice president.

Seaporcel Metals, Inc. — Lee Trillich, appointed vice president, production.

Reduction & Refining Co., Inc. A. R. Gaus, appointed executive vice president.

Milton Roy Co.—John Procopi, appointed vice president, international operations.

Mercer Lime & Stone Co.—R. F. Curtain, appointed vice president, sales.

Allis-Chalmers Manufacturing Co.—T. D. Lyons, elected vice president, administration, Industries Group; W. S. Pierson, elected comptroller; E. A. Spika, appointed asst. comptroller.

Bethlehem Steel Co. — F. M. Temmel, named associate director of research, chemical engineering, Research Dept.

K. R. Daniel, elected executive vice president, American Cast Iron Pipe Co.

Borg-Warner Corp.—E. S. Russey, elected chairman, Borg-Warner Ltd., Letchworth, England; H. B. Cranor, appointed managing director, Letchworth; S. B. Kurzina, Jr., appointed works manager, Borg & Beck Div.

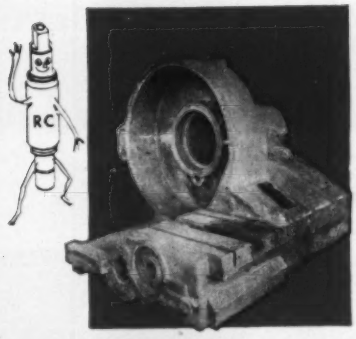
Chicago Bridge & Iron Co.—D. E. Stephan, appointed managing director, Chicago Bridge Ltd., England.

Goodman Manufacturing Co.—Howard Goodman, named chairman of the board of directors; J. S. Newton, appointed executive vice president.

Chromium Mining & Smelting Corp.—R. G. Nesbitt, appointed treasurer.

(Continued on P. 89)

E. B. Mancke, named director, project evaluation, Research Dept., Bethlehem Steel Co.



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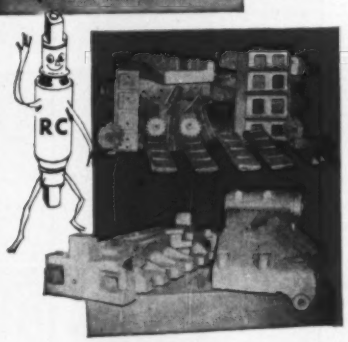

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(Continued from P. 88)

Falk Corp.—T. F. Scannell, appointed vice president-director, international operations.

National Castings Co.—A. E. Field, named a vice president.

Ritter Engineering Co.—W. H. Geary, appointed executive vice president.

Chrysler Corp.—T. A. Ostby, appointed director, market planning; F. E. Cogsdill, named director, marketing services; H. F. York, appointed manager, manufacturing engineering.

Hughes Aircraft Co.—Dr. L. C. Van Atta, appointed technical director, research laboratories, Malibu, Calif.; J. K. Cox, appointed manager, advanced development department, displays laboratory, ground systems group, Fullerton, Calif.

Foote Bros. Gear and Machine Corp.—R. G. Burson, appointed director, marketing, Industrial Products.

Motec Industries, Inc—W. B. MacKay, appointed director, manufacturing engineering.

Joy Manufacturing Co.—J. A. Ballantyne, appointed controller, Western Precipitation Div.; Norman Block, appointed director, engineering and research.

Republic Steel Corp.—E. G. Kondas, named general superintendent, Chicago district plant; C. E. Clark, appointed superintendent, and E. J. Bowman, asst. superintendent, Cleveland district plant.

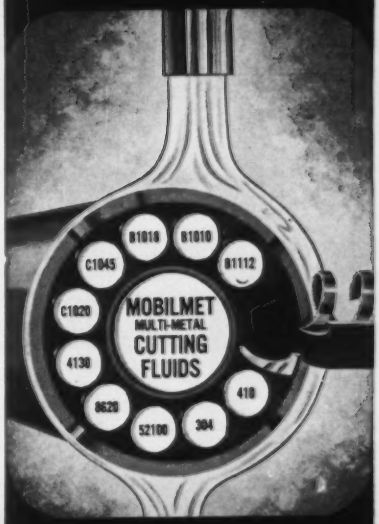
U. S. Steel Corp.—T. E. Grenfell, appointed superintendent, yards and transportation, South Works; W. L. Milliren, appointed works supervisor, production control, Joliet Works, American Steel & Wire Div.

Globe Pacific Hoist Co.—P. E. Hughes, named general manager.

American Tool Works Co.—A. C. Appel, appointed works manager.

(Continued on P. 92)

SEE AD ON FOLLOWING PAGES...



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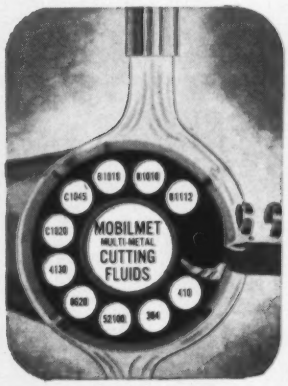

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Due to a unique additive combination, a single Mobilmet oil can be used on both soft, draggy metals and hard, brittle workpieces. As a result, there's less downtime for tool and cutting-oil changes. You get more production from each machine. And you save on handling costs, since you stock fewer oils. The wide range of Mobilmet applications includes: turning, drilling, boring, milling, gear hobbing, shaping and shaving, threading, tapping, pipe threading, surface and internal broaching, thread and form grinding, thread rolling, forming and special automatic screw machine operations.

Superior machining efficiency

In developing Mobilmet cutting fluids, Mobil research engineers made use of this Tapping Efficiency Tester to evaluate Mobilmet machining efficiency. In these tests and in field service on soft, draggy SAE1020 steel, new Mobilmet fluids out-performed cutting fluids designed specifically for this service.

Versatile new cutting oils offer you greater machine output, longer tool life, reduced loss from rejects, exceptionally wide range of applications! Now, after two years of exhaustive research and field testing . . . new Mobilmet* oils—the first multi-metal cutting fluids ever offered to the metalworking industry.

Mobilmet oils are uniquely versatile . . . help simplify your cutting oil requirements because each grade is effective over ranges of metals and operations beyond the capacity of any conventional product. And Mobilmet oils offer you superior machining results as well—in terms of improved finishes, longer tool life, and reduced staining.

Behind this versatility and effectiveness: a new additive combination, developed and patented by Mobil, which is pressure-temperature selective in its activity and—highly effective over wide ranges of cutting pressures and temperatures. For complete information, call your Mobil Representative or use coupon on preceding page.

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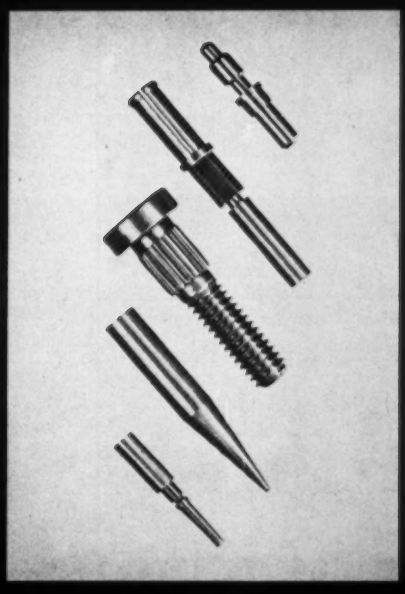
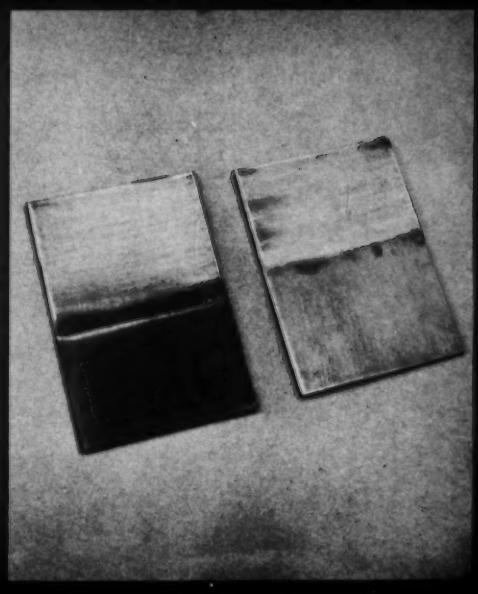
Longer tool life

Protected by heavy-duty Mobilmet, these pipe threading chasers, used for six weeks in moderately severe job-shop service, show little wear on either tool faces or thread crests. Mobilmet oils can mean longer tool life on soft or hard metals.



Fewer rejects

Because Mobilmet oils effectively control built-up edge and tool wear, you get superior finishes—fewer rejects. In some cases, Mobilmet oils reduce the need for additional finishing operations.



Less stain

New additive combination in Mobilmet oils inhibits staining effect. Plate on left was immersed in conventional corrosive cutting oil; plate on right was immersed in heavy-duty Mobilmet suitable for same application. Repolished tops of plates show original condition.

(Continued from P. 89)

General Electric Co. — A. J. Gizzi, appointed manager, manufacturing and engineering, Conduit Products Dept., Chemical & Metallurgical Div.; Dr. L. E. Saline, appointed manager, specialty devices operations, Defense Systems Dept.

American Chain & Cable Co., Inc.—E. S. Wellhofer, appointed plant manager, Monessen, Pa., plant, Page Steel and Wire Div.

Kilsby-Tubesupply Co. — W. G. Hargesheimer, named general manager.

Ford Motor Co.—J. W. Ford, appointed manager, Economic Analysis Dept.; J. G. Murphy, appointed traffic manager, Tractor & Implement Div.

Budd Co. — P. G. Hykes, appointed executive engineer, brakes and R. C. Norton, appointed executive engineer, wheels, Automotive Div.

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Stainless Steel	1800°F	Jet engine control rods
Superalloys	2100°F	Jet engine turbine vanes and blades
Molybdenum	3400°F	Space vehicle components, thermocouple tubes

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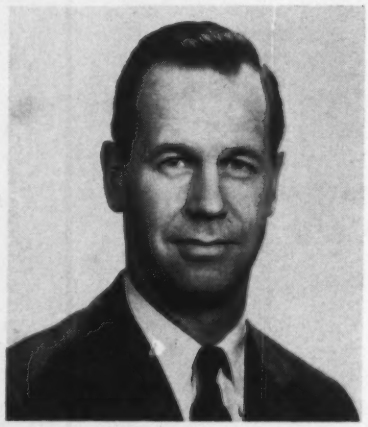
SINTERCAST DIVISION, WEST NYACK, N. Y.
SHUNK MANUFACTURING CO. INC., BUCYRUS, OHIO



H. C. Pease, named vice president, manufacturing, The Stanley Works.

Glidden Co.—R. L. Lozon, appointed vice president, purchasing and trade relations.

Glass-Tite Industries, Inc. — J. D. Fish, appointed director of purchasing.

Fairmont Railway Motors, Inc. —L. C. Morrow, appointed manager, purchases; T. A. Fancher, appointed asst. manager, purchases.

Alan Wood Steel Co.—A. D. Lagomarsino, appointed purchasing agent.

Youngstown Sheet & Tube Co. —L. J. Polman, Jr., appointed superintendent, construction, Indiana Harbor Works; R. W. Metz, named asst. manager, flat rolled product sales—galvanize, headquarters staff.

Soulé Steel Co.—S. W. Nightingale, appointed general manager, Roger Chung, named asst. general manager, James Kendall, named general sales manager, and Leroy Elmburg, appointed general operations manager, Steel Structures Div.

Radio Corporation of America—J. J. O'Donnell, appointed manager, circuit packaging and standards engineering, Commercial Systems Dept., Electronic Data Processing Div.

General Motors Corp.—Dr. Isadore Hodes, appointed head, plasma physics laboratory, Aero/Space Dept., Defense Systems Div.

Consolidated Electrodynamics Corp. — W. S. Dennis, Jr., appointed manager, quality control engineering, Data Recorders Div.; V. M. Meagher, appointed manager, Orlando, Fla., district office, Data Processing Div.

Thompson Ramo Wooldridge, Inc.—R. E. Richards, appointed eastern region district manager, TRW Computers Co. Div.

Barry Wright Corp. — J. B. O'Connell, appointed consulting field engineer, Barry Controls Div.

Pratt & Whitney Co., Inc.—Bayard Nicholas, appointed market research manager.

National Carbon Co.—J. E. LeMay, appointed carbon products marketing manager.

Eutectic Welding Alloys Corp.—G. R. McCloud, named manager, service, training and distribution center, Bay Area branch, Pacific Div.

Air Reduction Sales Co.—R. H. Merriman, appointed manager, gas marketing dept.; G. L. Werly, Jr., appointed general marketing manager.

Lindberg Engineering Co. — E. W. Edstrand, appointed manager, Kiln Div.

Rockwell Manufacturing Co.—J. H. Parker, named manager, sales development, Power Tool Div.

H. P. Deuscher Co.—T. M. Colligan, joined the sales department.

Seaboard Screw Corp.—Norman Schlee, appointed manager, Chicago office and warehouse.

OBITUARIES

D. L. Ogden, former general superintendent, United States Metals Refining Co. Div., American Metal Climax, Inc.

Charles Goeller, 84, retired president and manager, Charles Goeller, Inc., Roselle Park, N. Y.

A. B. Hennessy, Jr., 52, Chicago district sales manager, Summerill Tubing Co. Div., Columbia Steel & Shafting Co.

Armco Steel Corp.—E. K. Barney, appointed asst. general superintendent, Baltimore Works.

Bliss & Laughlin—J. C. Hansen, named manager, Medina, O., plant.

Cincinnati Milling and Grinding Machines, Inc.—E. J. Loviner, appointed manager, Detroit office.

North American Aviation, Inc.—Dr. R. L. Loftness, named eastern representative, Atomics International Div.

Metal & Thermit Corp.—Stephen Basarab, appointed manager, detinning plant, Carteret, N. J.

Michigan Tool Co.—F. W. Sorensen, appointed manufacturing manager, Cone-Drive Gears plant, Traverse City, Mich.; J. C. Penrose, named manager, Cone-Drive Research.

Textron, Inc. — Robert Murie, appointed chief engineer, Dalmo Victor Co. Div.

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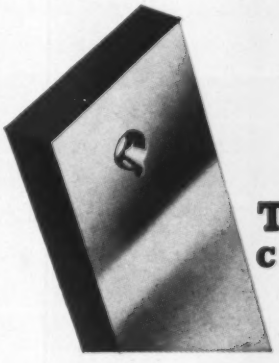

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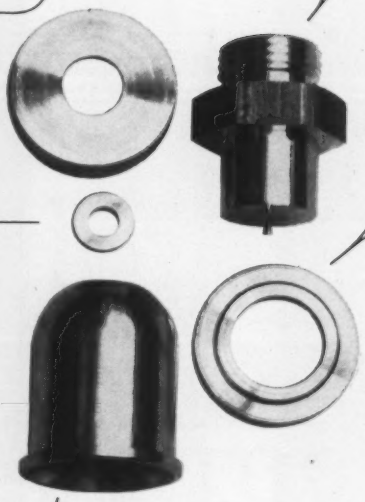

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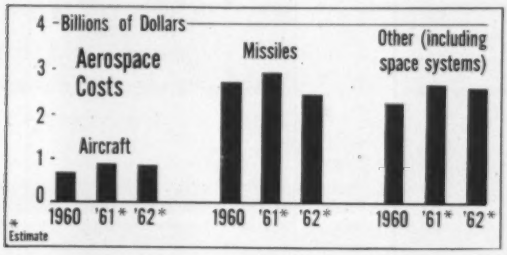
Aerospace Shifts Goals

The Dept. of Defense, in fiscal 1962, plans to spend nearly $6 billion for research, development, testing and evaluation, according to the Aerospace Industries Assoc. Some of the money



will be used to solve scientific problems involved with manned space flight. This effort reflects the change occurring in the aerospace industry as it moves from predominantly production to research and development.

Checks Surface Scratches

Scratches on the surface of spacecraft can often lead to problems. One company's analytical precision-measuring room uses a special microscope to measure scratches as shallow as 0.000005 in. The scope uses light waves to detect surface imperfections. It can measure them, either directly from the part, or by a special transfer technique when the affected surface is in a hard-to-get area.

Holds Strength at 2500°F

Two new columbium-base alloys retain useful strength at temperatures above 2500°F. Researchers at Du Pont's Metal Center claim the D-14 and D-36 alloys can be readily fabricated, welded and coated by normal methods. Various mill shapes, including sheet, are now being produced. Thicknesses run as low as 10 mils.

Search for New Materials

At the upcoming conference on Chemical Physics of Nonmetallic Crystals, scientists from 13 nations will aim their thoughts toward developing tailor-made materials. The U.S. Government terms the lack of materials a serious road block in our quest for space. The last 18 months has seen $15 million go to universities for materials research. In '57, the Russians had an impressive total of 200 trained crystallographers and we know they are not standing still.

MHD Fills the Space Gap

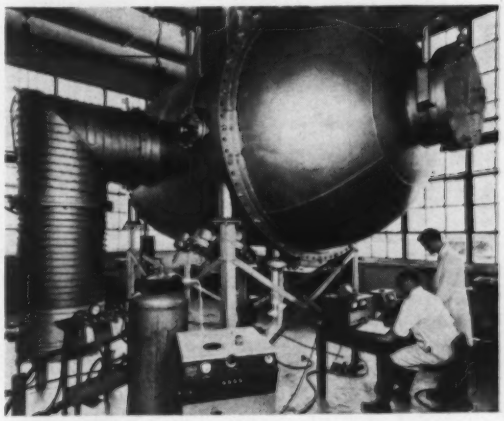
Magnetohydrodynamics has moved into a critical spot in the deep-space program as a result of recent Air Force studies. Existing chemical rocket engines and proposed ion propulsion engines leave a big gap in the scientific area that would be required to move our planned big ships from one planetary orbit to another. MHD fits neatly into the niche left by other systems.

NASA Looks for Lab Site

NASA plans to build a $60-million space lab in the south to develop space craft for project Apollo. A survey team is now looking for a suitable 1000-acre site. It must have machining, fabrication and construction industries nearby. Sites are being considered in areas near Jacksonville and Tampa, Fla., Baton Rouge, Bogalusa and Shreveport, La., and Victoria, Corpus Christi and Dallas, Tex.

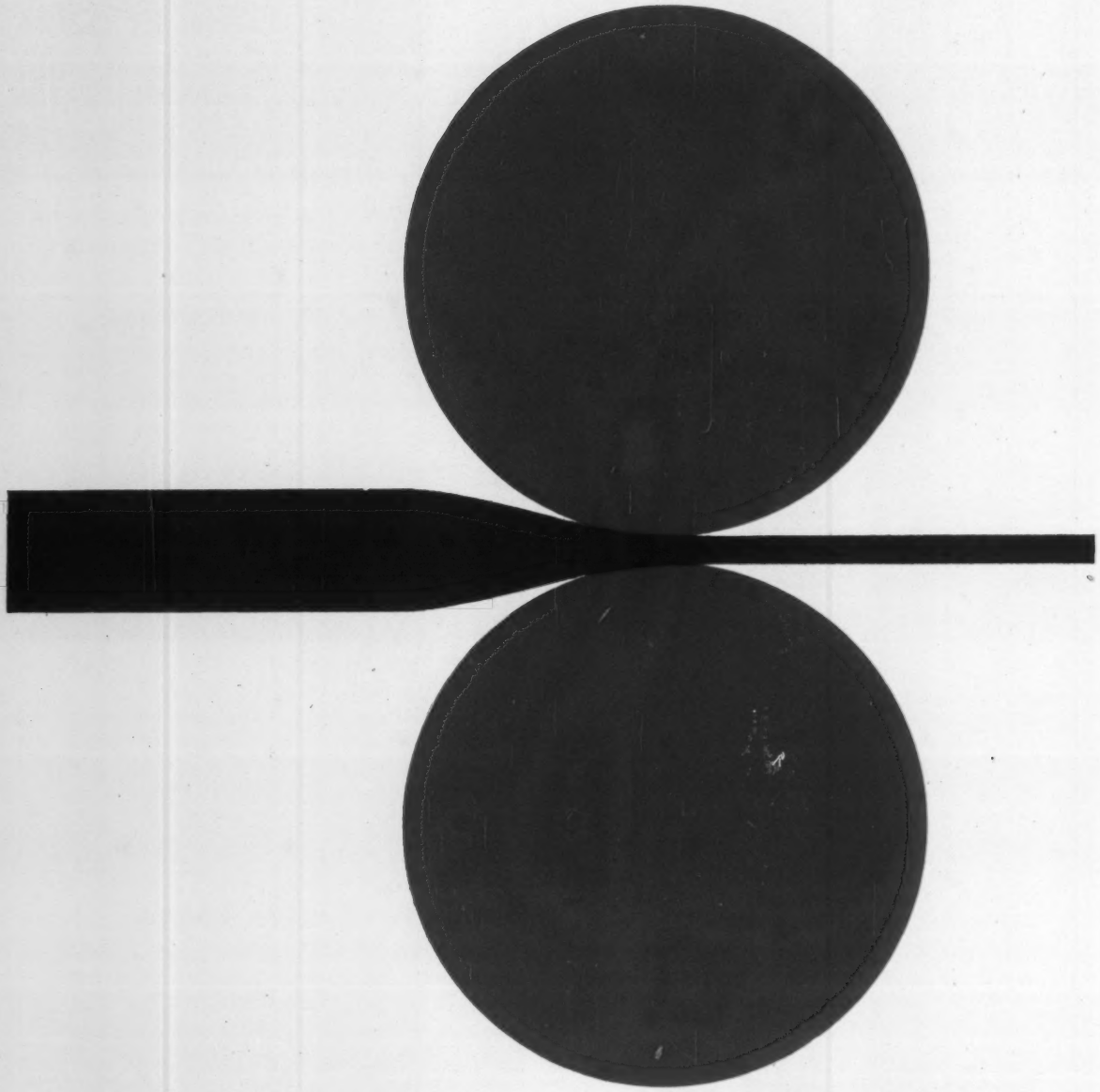
Simulates Outer Space

Researchers at Chicago Bridge & Iron Co. cooped up a bit of outer space in a stainless-steel-clad vacuum chamber. The unit will simu-



Clad Chamber: Simulates cold black space.

late conditions at 800,000 ft by attaining a pressure of 5×10^{-7} mm of mercury. The system could be used for the heat sink which simulates the cold 'black space' a satellite would encounter.



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Coextrusion Comes to Nonmetals

Process Attacks Tomorrow's Problems Today

Metalworking is entering a new era wherein performance must meet exacting demands.

With this in mind, coextrusion is a sure bet to become a useful fabricating tool.

■ For several years coextrusion has solved many pressing problems in the atomic energy industry. The ability of this process to clad dissimilar metals into tubing and rod form has prompted hundreds of successes in nuclear fabrication.

At Nuclear Metals, Inc., a division of Textron, Inc., Concord, Mass., coextrusion is making rapid advances. It's no longer restricted to such metals as zirconium, uranium and stainless. Basic research is paying off by readying the process for hosts of materials. Refractory metals, powder metals and ceramics are all moving through the presses.

"Clad materials will be the answer to many industrial problems," says H. H. Willis, president of Nuclear Metals. "It's just a matter of time before they will be used widely in metalworking practice. And coextrusion will supply the impetus for their acceptance."

THE BIG PRESS: Operations on 1000-ton press normally require one man at the controls. Special jobs require individual handling.

New Shapes—The process is no longer restricted to tubing and rod. Geometries have been extended in many cases to include flats, hexagons and channels. A good example is the successful extrusion of a 40-ft long beryllium channel for the Air Force.

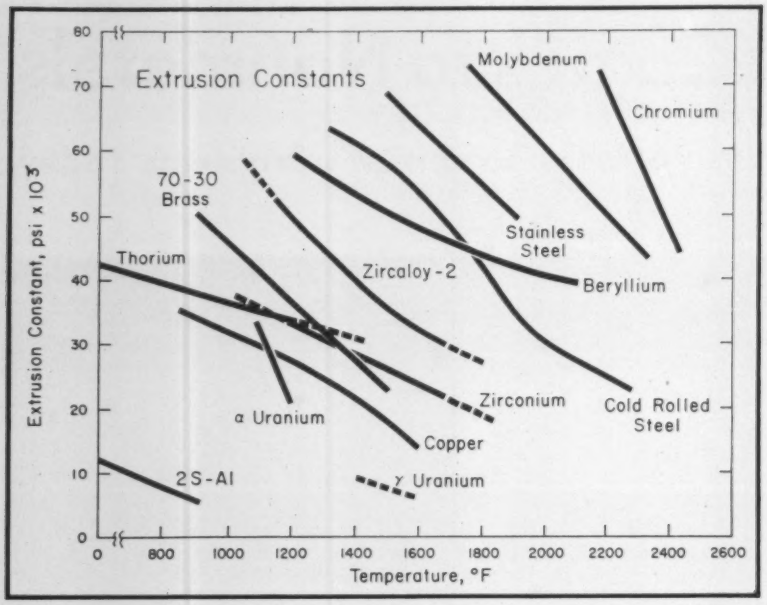
The major forces involved in coextrusion are uniquely compressive. As such, you can work brittle materials that can't be worked by any other method. The bond between materials is metallurgical rather than mechanical. There's little if any alloying at the interface.

At present, the company operates three extrusion presses. Their capacities are 100, 300 and 1000 tons. The big press has a ram speed of 140 ipm. A new press is on order. This one is being designed to achieve speeds of 1000 ipm. Aside from its speed, the new press will be adaptable to a greater variety of high-temperature jobs.

There are many combinations of heating furnaces to aid the coextrusion process. All of them are equipped to handle atmospheres of argon, nitrogen and hydrogen.

Business Is Good—Management noticed that many inquiries were coming in for non-nuclear applications. The inquiries and orders grew to such size that the company was forced to set up a new division, the

Which Ones Fit the Process?



Custom Services Dept., to tackle the workload.

The department receives orders from a wide range of sources. An electronic source requested 1000 ft of nickel-clad copper wire. Another order was filled for columbium tubes clad with stainless steel. These tubes will be used to carry liquid metal in heat exchangers.

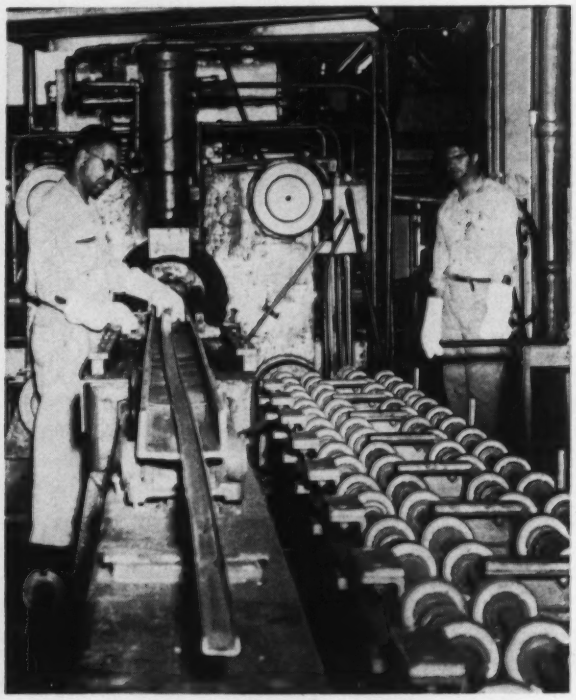
Here are a few production feats at NMI: zirconium tubing clad on both the ID and OD with 1-10 mils of stainless; beryllium tubing with thin wall and closely spaced helical ribs; and rods of dispersion-hardened platinum. A good example of dissimilar-material cladding is the coextrusion of uranium oxide with stainless.

Rule of Thumb—There are limitations, however, on the materials you can coextrude. The two materials must have similar stiffness. This factor is illustrated in the chart.

Note the difference in stiffness between pure aluminum and chromium. These metals, of course, cannot be coextruded. Stainless and beryllium, on the other hand, or Zircaloy-2 and copper, could be coextruded with ease. In general, coextrusion is possible as long as the materials differ no more than 50 pct in stiffness.

Streamlined Flow—The principle behind NMI's extrusion work is called "streamlined flow." This concept is more advanced than the original principle of turbulent flow. In streamlined flow, each transverse

ADDED SERVICES: The company can also handle drawing, swaging, compacting and machining.



BERYLLIUM CHANNEL: Extrusion was successful in producing this 40-ft long channel of beryllium.

cross section of the extrusion billet retains its relative geometric relationship in the extruded rod.

Unless the materials are reactive, billets are extruded bare. Other materials require that the billets be enclosed inside a metal can. The can furnishes protection from the atmosphere and also serves as a lubricant during extrusion.

Increased availability of metals in powder form comes at the right time for coextrusion. According to Paul Lowenstein, director of NMI's Mechanical Metallurgy Dept., powder metals can supply a multiplicity of properties. You can't always find these properties in cast and wrought alloys.

Profitable Path — Research and development work follows a devious route. Along the way, many startling discoveries are made. R & D studies in coextrusion, for instance, prompted a breakthrough in bonding where tubular transition joints can be produced between dissimilar metals.

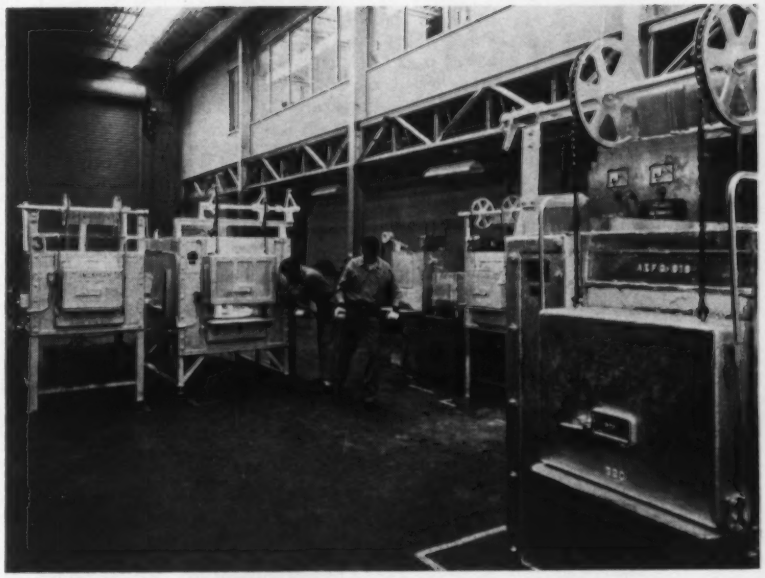
The joint is made by pre-shaping the mating surfaces of two metals to make an extrusion billet. The billet is sheathed to prevent oxidation, then extruded. Heat and pressure are applied during the extrusion process. The result is a very thin layer of intermetallic compound along the tapered interface.

At Concord, joints can be made in sizes ranging from 0.060-3.5 in. diam with a wall thickness range of 0.012-0.250 in. Among the metals bonded to date are stainless to Zircaloy and stainless to titanium. Bonds have also been produced between stainless and columbium, mild steel and Zircaloy, and Inconel and Zircaloy.

Leakproof Joints—From the standpoint of quality, the transition joint offers absolute leak tightness. Joints made by rolling or other mechanical means aren't up to that standard.

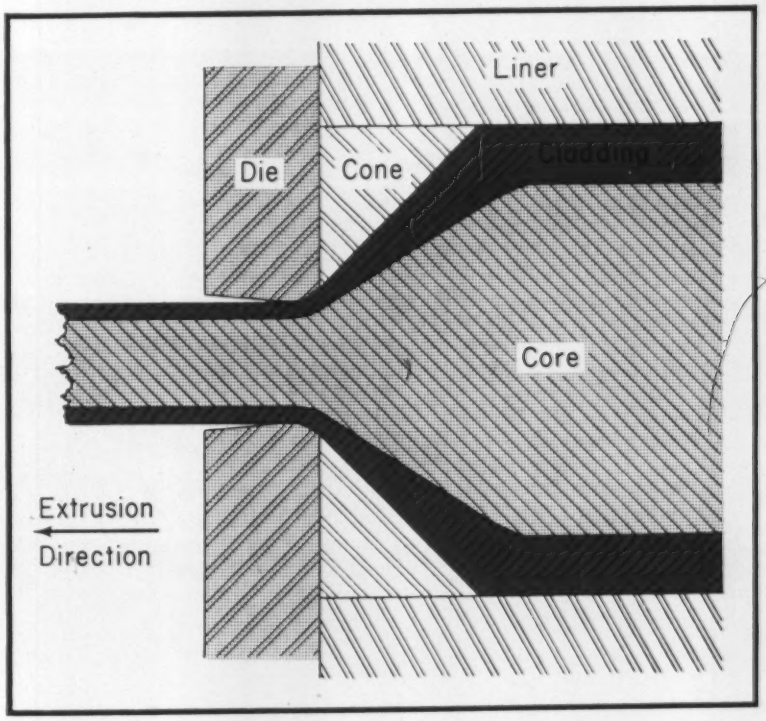
One of the recent projects at the company involves the successful hot extrusion of true oxides. Included here are uranium oxide, beryllia, aluminum oxide and barium titanite.

This is done in NMI's multi-temperature extrusion process. One material is extruded above 2000°C, while the other is extruded at some temperature under 1000°C.



HEATING TEAM: Extrusion is served by furnaces up to 2500°C. Included are resistance, induction, and salt- and lead-pot furnaces.

Conical Die Aids Coextrusion



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Ask for Reprint **No. 210**

New Mold Methods Stir Interest In Reactive-Metal Casting

Patterns, once used for casting stainless-steel parts, now lend a hand on reactive metals.

One company combines rammed-graphite cores with machined graphite molds. Thus, complex shapes can be easily cast.

■ Technological advances often come in pairs. A good example of this is reactive-metal processing. Production of high-purity titanium and zirconium was made possible by vacuum-melting techniques. These in turn led to vacuum casting to prevent contamination while the molten metals were being formed into usable shapes.

Oregon Metallurgical Corp., Albany, Ore., is adding to its store of know-how some new twists in molding. The company found another use of sand-mold patterns that were originally designed for making stainless-steel castings. The same patterns now produce rammed-graphite molds for casting reactive metals.

Good Combination — For complete design flexibility, machined graphite molds, which can be used over and over, are combined with expendable rammed-graphitic cores. The combination makes possible the relatively simple casting of some very complex parts.

Oremet uses conventional foundry techniques to make the rammed graphitic molds. A special formula is used for the mix it hand-rams into the patterns.

The mix found to be most suitable consists of about 70 pct graphite powder (grade BB5 supplied by National Carbon Co.), 5 pct starch, 10 pct foundry pitch, 8 pct carbonaceous cement, and 7 pct water. After ramming, the mold is air dried for 16 hours and then oven dried for 24 hours at 250°F and again for 24 hours at 1650°F.

Inert Material—During the curing cycle, the starch binder bakes out. This leaves a mold of pure carbonaceous material that is inert to the molten reactive metals. Some of the rammed molds are reclaimed by pulverizing and screening.

Rammed-graphitic molds have a relatively low chilling rate which results in a better surface finish. Surface lapping problems are ended by bottom gating to reduce turbulence and metal roll-up. In vacuum casting, heat transfer is strictly by conductivity and radiation.

Titanium's shrinkage factor (including both mold and metal contraction) is about ⅜ in. per ft, while stainless steel's is about 5/16 in. This difference is often negligible. Outside dimensions clean up to machined dimensions with less metal removal.

Pickup: No Problem—The extremely thin surface layer of carbon pickup is about the same for both rammed and machined graphite molds. It usually ranges from only 0.012 to 0.02 in. and often can be ignored.

If desired, the layer can be easily removed by pickling. It can also be caught during final machining. A high-quality graphite mold powder will eliminate metal penetration problems, even on very thin sections.

Oremet is investigating the effect of particle size, and the possibility of impregnating the mold surface with graphite particles. This produces a denser surface.

QUICK BREAKDOWN: Machined graphite molds are removed from titanium castings by simply turning the fasteners.

Titanium and zirconium castings produced in rammed graphitic molds are extremely sound. The reason: The mold is porous enough to eliminate small quantities of gas from being trapped.

Try Shell Molds—In casting parts such as impellers, with section thicknesses less than ⅝ in., shell molds made in a conventional core machine are used. On intricate shapes, with as little as ⅛ in. between shrouds, machined graphite cores get the nod since they add strength and closer dimensional control. Cores are easily removed by drilling an axial hole and sandblasting out the graphite.

Zirconium is a little more difficult to handle and it is not always possible to use the techniques that work so well with titanium. Although basic methods are common, zirconium is processed with more of a white glove approach.

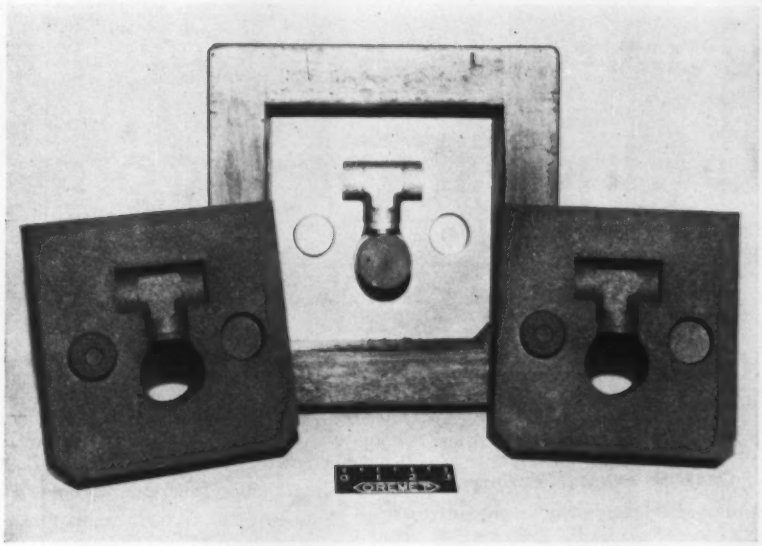
Using a minimum of material, Oremet dry-mixes its shell-molding stock from graphite powder, a thermosetting resin, and a high-temperature pitch binder.

The mix is placed into a hot pattern cavity, gas-heated to about 400°F, and is held under air pressure for five seconds. Then the loose powder is dumped out. The resin sets in about 10 seconds after making contact with the hot pattern.

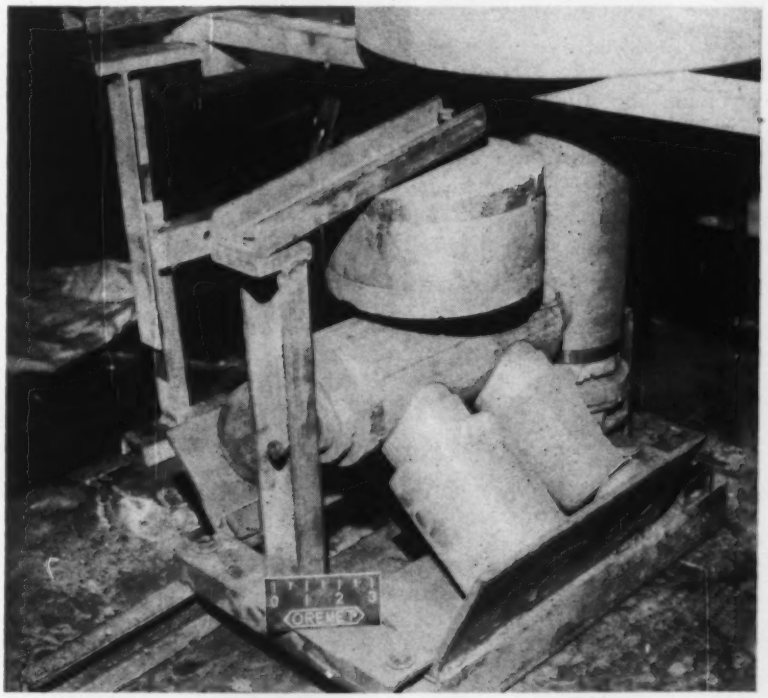
More Materials — Oremet also uses graphite molds for unalloyed molybdenum; 99.5 pct Mo-0.5 pct Ti; 85 pct tungsten-15 pct Mo, and columbium to keep pace with space-age demands for high-temperature structurals.

Experiments are also being made on unalloyed tungsten, which melts at 6150°F. In these metals, centrifugal castings up to 400 lb have been poured.

The company is concerned with the fluidity of the molten metals and its effect on shrinkage; the design of castings with regard to thermal gradient; location of risers and the correlation of feeding distance with section thickness.



RAMMED MOLDS: These two rammed graphite molds for casting titanium pipe tees were made from the pattern in the center.



MOLD ASSEMBLY: Larger castings require an assembly of graphite mold parts. They are clamped together to form a complete graphite mold.

It is searching for a clear explanation of just what shrinkage is; of the behavior of trapped gases and their effect on porosity as they migrate to the thermal center that remains liquid for the longest period of any portion of the casting.

The answers to these and many other questions are being checked. Out of such extensive work are sure to come even more radical casting techniques. These may eventually rank the reactive metals among metallurgy's work-horses.

Control Computers Extend Scope Of Industrial Automation

By **W. R. Harris**—Mgr. Industrial Engrg., and **E. L. Harder**—Mgr. Advanced Systems Engrg. & Analytical Dept., Westinghouse Electric Corp., East Pittsburgh, Pa.*

Automation is a magic word. Where will it end? Can computers solve early bugaboos?

Control computers introduce some far-reaching automation and data-processing concepts.

■ In general, the control computer is merely another step in a continuing and longstanding trend toward more and more automation.

What does the future hold for the control computer? Or, more important, how will this computer serve industry. Its amazing versatility and effectiveness have already led to results which were undreamed of a few years ago.

Fills Need—Most machines and processes are becoming more and more complex. As a result, data processing has emerged as a separate organ. This organ, normally called a control computer, handles all intelligence functions.

No company can afford to make unreliable products. Mistakes are costly. From a purely mathematical viewpoint, they're also becoming more likely. This is the natural result of more complex designs.

Future control possibilities are far beyond the scope of today's common control devices. A control computer gives us new insight into the functions of these limited devices. It also introduces some far-reaching concepts in automation and data processing.

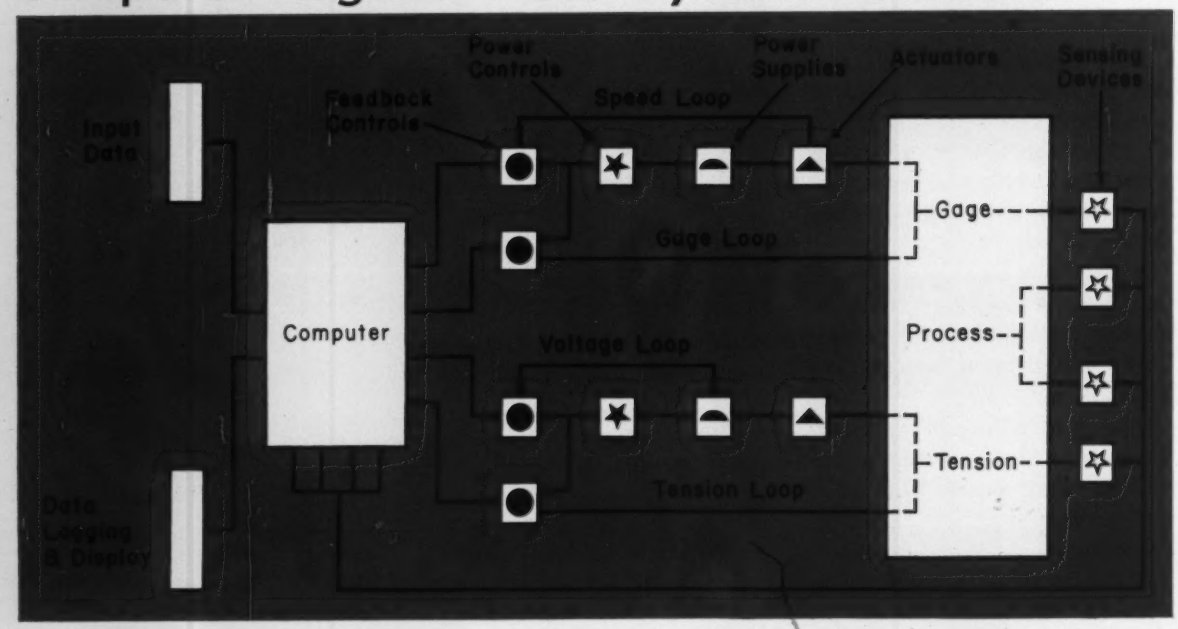
Prime Factors—All systems or processes have two essential ingredients: One centers on work-handling phases; the other hinges on working data that must be associated with these various phases. Included with the latter ingredient are all business data related to the overall job or process.

The concept of two separate and distinct functions, mechanical work and data processing, wasn't fully recognized in early control systems. In fact, data-processing operations were usually buried within the machinery. Thus, they were hard to distinguish from the power-handling elements.

Let's check out a machine tool's feedback-control system. This case

*Abstract of paper presented at recent Computer Symposium in New York City.

Computer Regulates Sub-System Functions



in point shows that certain signals, including speeds, positions, levels and accelerations, have numerical values.

One Plus One—These digital values are acted upon according to fixed mathematical laws. This means these quantities represent a form of data, even though they're processed by the machine tool's mechanisms.

Almost without exception, control computers use digital concepts. Why? Because all types of quantitative data can be digitally expressed with great efficiency and power.

Digital data are concrete values. An electrical contact is either open or closed: In-between states aren't important.

Analog and digital data mix in many systems and processes. Digital values depend on both electrical and mechanical devices. With gear ratios, there's a digital multiple from one gear's teeth to its meshing mate.

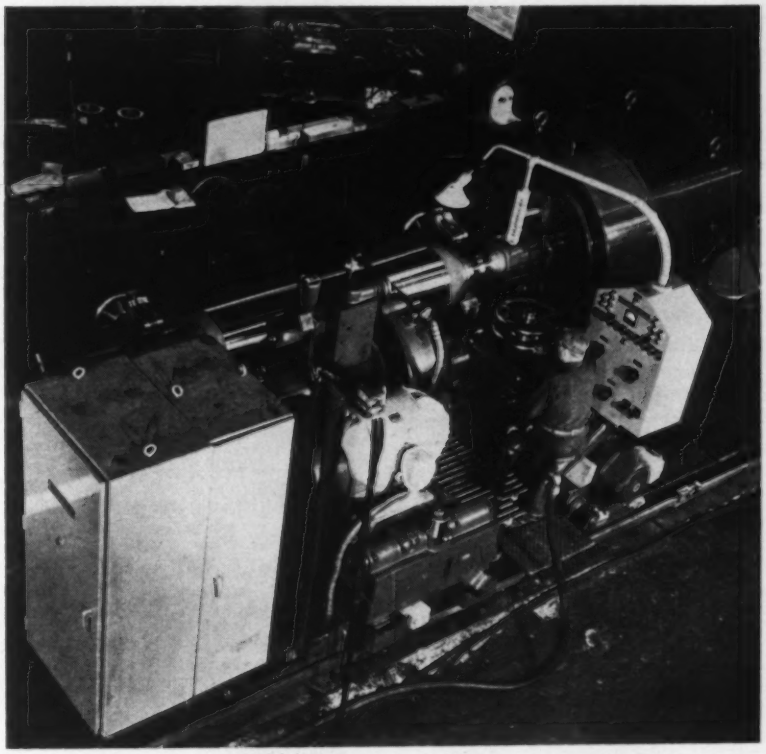
Analog Analysis — The analog mode of expression is also common. A clock's hands or a dial's position indicate a certain value of a changing quantity. Machine tool speeds, shaft positions and voltages are a few common analog quantities.

These quantities are generally dealt with by analog - computing means. For example, two voltages can be added by connecting them in series.

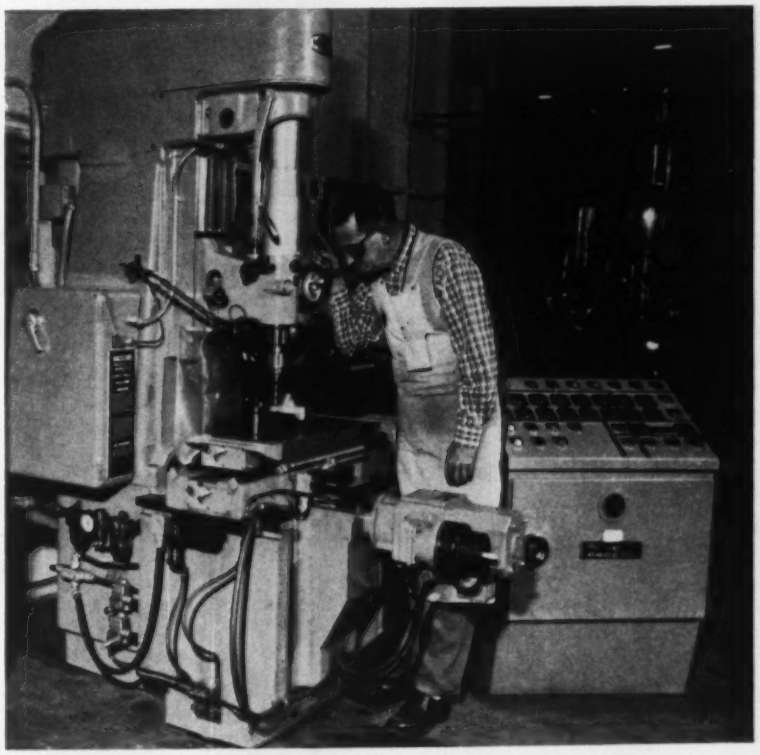
Most of the inherent relationships that follow the laws of nature are, and always will be, analog in behavior. There's a continuous relationship between acceleration and force. Digital data can only approximate this type of relationship.

Some controls operate on analog principles One example is set-point controllers. These units regulate quantities such as temperature, pressure or position.

Digital Control—However, digital representation is becoming more important in processing the complex data that's associated with modern machinery. Also, it's beginning to encroach on areas previously dom-

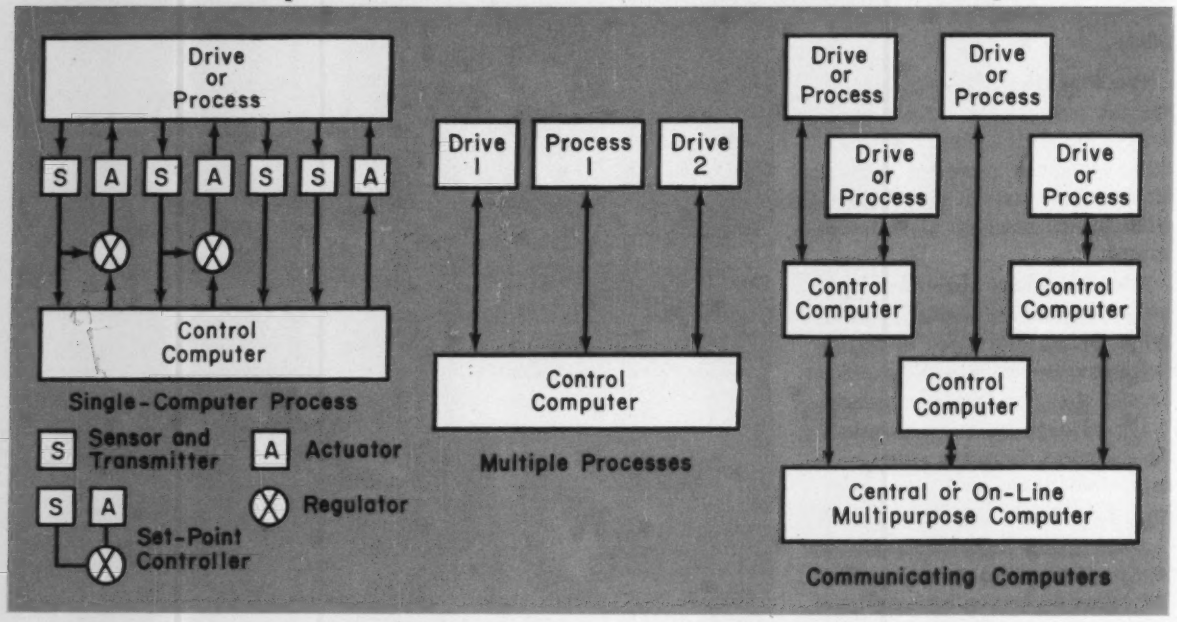


ROLL GRINDING: When a computer is used, waste and rejects tumble. The computer dictates just how much must be ground from a worn roll.



PRECISION DRILLING: Computer compares in-process data with programmed instructions. Final calculations optimize process cost and quality.

Check Computer's Role in Feedback Loops



inated by analog devices.

Many set points are now digital. There are digital speed regulators, digital position controllers, direct digital sensors and digital shaft-position indicators.

This digital encroachment is only natural. Digital processing is the most efficient way to handle data. Therefore, there's an advantage in producing the data initially in digital form. Position and required-action signals should also follow this form.

Now let's consider the computer's role in industrial processes. The computer's relationship with other control and power devices is paramount. A generalized illustration shows some of these relationships.

Basic Processes—The process itself can be one of three basic types. One type requires heavy drive motors to operate process machinery. Examples include rolling mills and forming machines.

A second type centers on the "stream" processes. There are many examples in the petroleum-refining and chemical industries. Steelmaking is, of course, a prime example.

In these stream processes, changes are made in chemical formulas, or the heavy and light fractions of composite materials are separated. These processes use valves, dampers, pumps or heat as controls and/or actuating means.

What is the third basic process? It concerns product fabrication. Pieces may be made by the millions as in the auto industry. Conversely, small numbers may be turned out for units such as turbine generators, air compressors or rolling mills.

Bring in Power—Regardless of what the process delivers, an actuator must be employed. It can take the form of a drive motor or even a remotely-operated valve.

To provide energy for operating the actuator, you've got to have a controlled power supply. Power supplies come in many forms. Large motor-generator sets drive heavy steel mills. Pneumatic valves, on the other hand, only need a compressed air supply.

The next step in a processing line is the power-control devices. They take the form of circuit breakers, contactors and sequencing relays. Feedback controls are also very important.

Several simple illustrations depict various sub-system feedback loops. These loops control speed, voltage, current tension and even the gage of the material being processed.

Calls Signals—The computer issues commands to the feedback- and sequencing-control systems. It uses data about the process which has been gathered from a variety of sensing devices. It also compares this in-process data with programmed input data.

Next, the computer makes calculations—based on a mathematical model stored in its memory. These calculations lead to adjustments which optimize process cost, quality and output.

Except in isolated cases, the computer doesn't take the place of conventional control devices and feedback systems. Instead, it's applied to them to enhance their value. In effect, the computer's main function is to extend man's sensory perceptions and his intelligence to production equipment.

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Furnace-Lining Time Tumbles

Dumping Device Simplifies Ramming and Gunning

A new type of container offers many advantages to users of ramming and gunning mixes.

It even maintains critical refractory-mix grain sizes.

■ Industrial teamwork sparked the development of a new handling concept for refractory ramming and gunning mixes. These mixes are used to re-line, re-surface and repair openhearth and electric furnaces.

Joint efforts by Kaiser Refractories, a division of the Kaiser Aluminum & Chemical Corp., Oakland, Calif., and the Corrugated Container Corp., Columbus, O., led to a totally-new bulk container.

Easy to Lift—This new container is called the Kaiser-Pak. It consists of an outer triple-walled corrugated carton that's permanently mounted on a wooden pallet. Dimensions are suitable for easy handling by fork-lift trucks. A built-in barrier protects the contents from moisture.

There are two separate containers inside each outer carton. Each has a capacity of 1000 lb of ramming or gunning mix. Separate bottom-pouring spouts allow each container to be dumped individually.

It's also possible to dump both internal containers at the same time. This means you can deposit a 2000-lb mix in a matter of seconds.

Snags and Tears—Until now, most gunning and ramming mixes have been shipped in 60- and 100-lb multi-walled sacks. These sacks require lots of manual handling. On a large-scale job, sack-handling costs mushroom. And breakage is common.

The new container can be handled entirely by a lift truck. After the truck lifts the container into position above a mixer, the operator simply pulls a preformed tear strip.

As he tears away the preformed strip, a pouring spout forms. This allows the contents of one of the inner containers to fall freely into the mixing unit. An entire inner-container load drops in about 30 seconds.

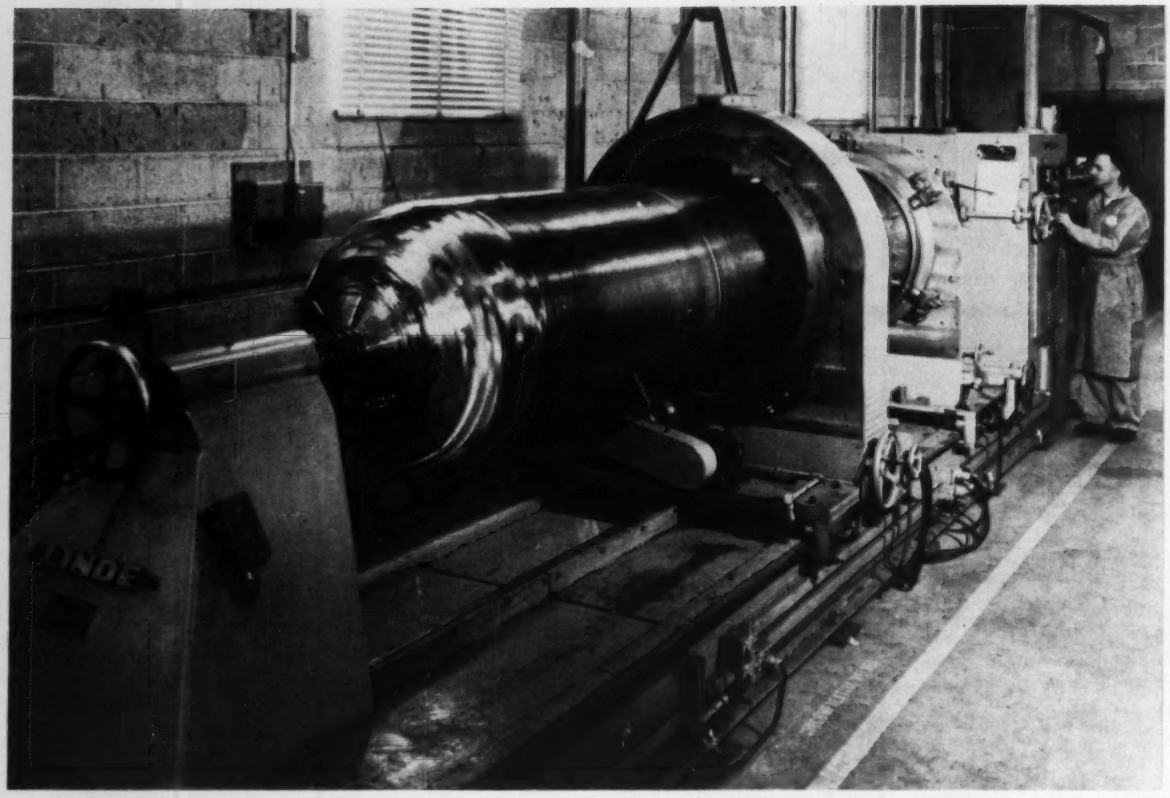
Fill 'er Up—To fill pneumatic-gun hoppers, you use the same general procedure. In this case, however, the flow of material into the gun takes a little more time.

Most guns have a screen on the top of the hopper. This screen restricts the flow of the mix. In general, it takes about three minutes to fill a 2000-lb capacity gun.

Each bottom pallet measures 36 x 32 in. The carton itself is 43 in. high; but this height may be varied according to the density of the ramming or gunning mix.

UP AND OVER: Fork-lift truck positions dual container over a mixing unit or pneumatic-gun hopper.

ZIP, IT'S OPEN: Operator dumps 2000 lb of refractory ramming or gunning mix in only three minutes.



CUTS DISTORTION: By welding from the inside, the metal thermal expansion forces the joint tightly against the backup bar. This stops distortion and forms a tighter seal for the argon gas backup.

Designers Control Distortion By Welding Inside Out

Distortion is a problem that creeps into most welding jobs. Here's a new twist to study.

By welding from the inside, one company forces the joint against an outer backup bar.

■ Today's missiles demand the most reliable fabricating methods. The U.S. Army's new surface-to-surface Sergeant missile uses a solid propellent rocket motor which produces thousands of pounds of thrust. The interval pressure acts equally in all directions within the steel-shell motor case.

To insure reliability of the all-welded design, Sperry Utah Engineering Laboratory, Salt Lake City, needed tailor-made automatic welding machines to fabricate the rocket motor cases.

The cases are made of 4130 high-strength, low-alloy steel. The 0.109-in. thick wall must be rigidly held during welding to control distortion. This keeps joint alignment within close tolerances on both the longitudinal and circumferential welds.

Studies Facts—After study of the problem's many factors, fixturing, automatic controls, welding process, and inspection, Linde and Sperry engineers decided welds should be made from the inside.

By welding from within, thermal expansion of the metal forces the joint tightly against the backup bar. This provides positive control of distortion, and forms a tighter seal for the argon gas backup.

Three machines are needed to complete rocket-motor cases. The first, a dome welding machine, welds the flange fitting on the forward dome. The second, a longitudinal welding machine, welds the basic cyclindrical shape. The third, a circumferential welding machine,

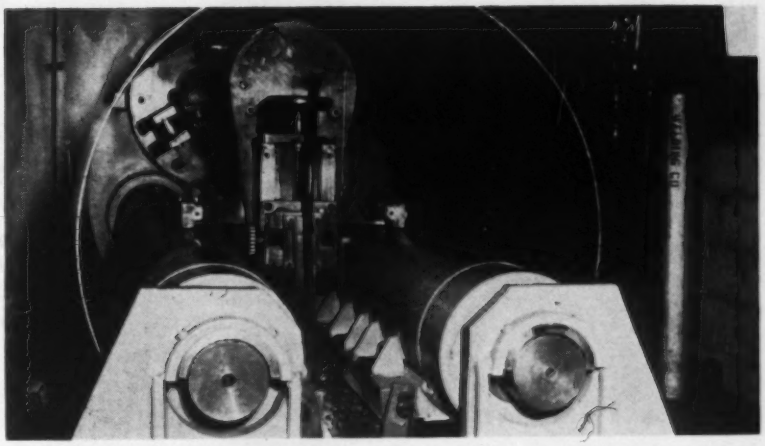
joins the domes and cylinders together to complete the rocket-motor case.

Added Feature—All three machines have backup elements which preheat the work and retard weld cooling—thus preventing formation of excessive brittle martensite (the brittle element in steel).

Short-Arc welding with automatic controls was chosen to make the specialized welds. After pre-heating, the parts are welded using Oxweld 71 Mn-Si steel wire, 3/64-in. diam., and Linde C-25 (25 pct CO_2 and 75 pct argon, shielding gas. Pure argon is used for the weld backup.

The large circumferential welding machine makes its four girth welds by having the fixturing elements move to various positions on the base. Centers of rotation on the machine are within very close tolerances because of strict requirements for straightness.

Arc wander is reduced to an insignificant level because Short Arc welding is less affected by magnetic disturbances than the normal spray-type welding. Uniform penetration and weld quality, so essential to this job, are easily held.



QUICK INNER PASS: Longitudinal seam welding machine lays 48-in. of weld bead on Sergeant's rocket motor case in two minutes.

Joint design puts a special burden on the welding process. It must penetrate completely and uniformly in only one pass. Sperry reports high reliability with less than 1-pct rejects.

Three-Way Check — All welds must pass rigid X-ray inspection. Radiographic film is placed along all weld seams. Both surface and sub-surface imperfections, such as undercut, incomplete penetration and porosity will appear on the film.

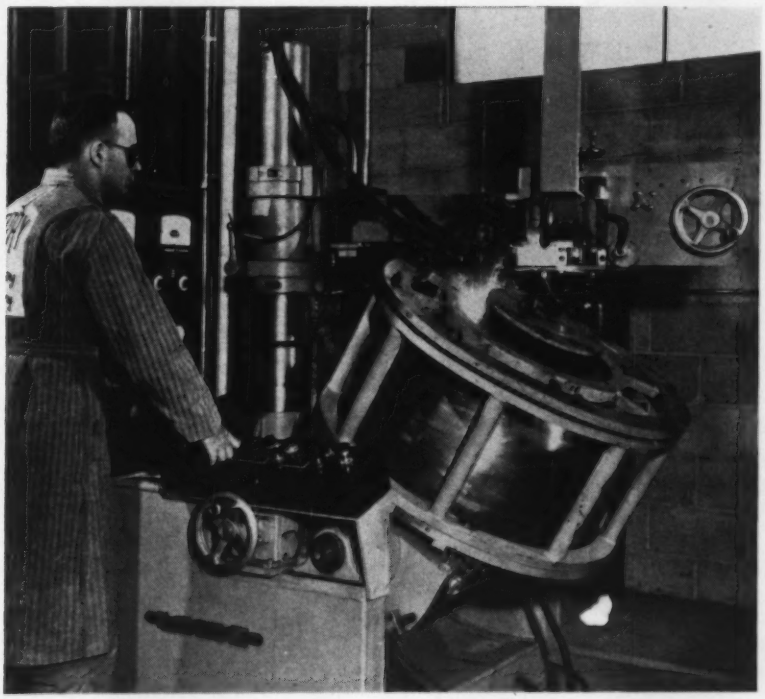
Any defects are ground out and rewelded. Less than 1 pct of the Short Arc welds need reworking. Previously, 10-15 pct of the welds required reworking.

Magnaflux testing determines weld soundness. Five electromagnetic coils are placed around or along the seams within 1-in. of the welds. As a magnetic field is induced in the metal, magnetic solution is sprayed onto the surface. The resulting pattern indicates whether the metal contains surface or near-surface defects.

By a third test, a hydrostatic pressure of 830 psi checks the structural integrity of the rocket motor case. A few motor cases are tested to destruction to determine bursting pressure, thus assuring that the welds are as strong as the parent metal.

Ideal Load — Rupture pressure ranges between 1200-1500 psi. Structural engineers have determined that bursting pressures of 1100-1500 psi are ideal for the Sergeant motor case.

Too low a bursting pressure indicates soft metal or defective areas. On the other hand, too high a bursting pressure indicates probable brittleness.



AUTOMATIC SETUP: Operator, at the console, controls dome welder. The unit completes a single pass weld on the dome in 105 seconds.

Hydraulic Tracers Put New Life Into Old Machine Tools

Are you looking for a chance to make machine tools pay off more of their original costs?

Perhaps the hydraulic tracer is the solution. It opens the door to diversified workloads and low-cost automation.

■ Automation is now within reach of the small manufacturer's purse. Production-tested hydraulic tracers can be adapted to almost any type of machine tool.

These precision tracers reduce setup and tooling costs on both short-run and high-volume jobs. They're easy to install on turret lathes, contour and surface grinders, boring machines, production lathes and other metalworking equipment.

Conversion is simple. Each tracer-control package is individually powered by a special hydraulic system. This patented system replaces some of a converted machine tool's old operating mechanisms.

Custom Retooling—As part of a planned diversification program, the Detroit Broach & Machine Co., Rochester, Mich., acquired licensing rights to this hydraulic-control system. As a result, the company is now retooling individual machines to fill specific needs.

The age of the machine that's to be converted isn't important. And it doesn't have to be in perfect condition. The important thing is that the base is rigid and spindle-head and tailstock assemblies are strong enough for the new application.

Likewise, the condition of the lead-screw assembly is immaterial. Why? Because the lead screw isn't needed after conversion.

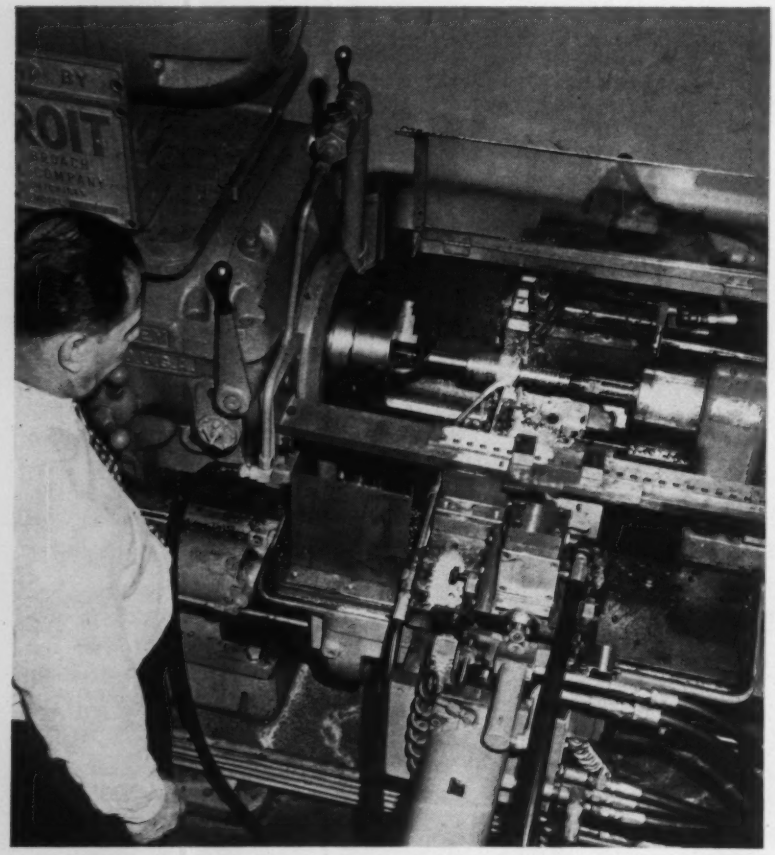
Constant Cutting—After conversion, the cutting tool is generated continuously throughout each cutting cycle. There are no interruptions, regardless of the complexity of the contour being formed.

No extra valves or switches are needed to change the forming tool's direction. Even when the part's contour abruptly changes direction, there's no momentary tool-dwell lag. This means all burrs, tool marks and steps on the machined surfaces become problems of the past.

Any machine, horizontal or vertical, can be easily converted into a precision tracer-controlled unit. The cost of converting a useable machine tool with the hydraulic-tracer package runs about 50 pct less than the cost of a new tracer-actuated machine.

Complete Control — Specially-trained operators aren't needed for the modified machine tools. The precision tracer maintains full two-way hydraulic control over all cross-slide and horizontal movements. Thus, any shop trainee can operate the unit with no sacrifice in output quality.

Changeovers from one workrun to another take just a few minutes. All the operator does is switch templates. Then he adjusts two limit



RETOOLED LATHE: A pair of hydraulic cylinders take the place of the cross-slide and gear-box mechanisms on this tracer-controlled lathe.

switches, one at each end of the longitudinal travel. He doesn't have to make any adjustments to the tracer valve.

A micro-slide device handles all tool-wear adjustments. This device shifts the tracer valve's position with micrometer accuracy.

When stock removal is extra heavy a multi-pass cycling arrangement can be added to the standard tracer unit. It automatically provides several roughing passes, followed by one final-finishing pass.

Hard to Reach—An interesting case study centers on the male and female dies used to shape jet-engine airfoil blades. Tolerances on these dies must be held within 0.0005 in. The tracer manipulates a grinding wheel in the female die's cavities. Heretofore, these cavities were virtually inaccessible.

With a hydraulic-tracer-control unit, each die section is finish-ground in about 30 minutes. These dies turn out airfoil blades which are ready for use.

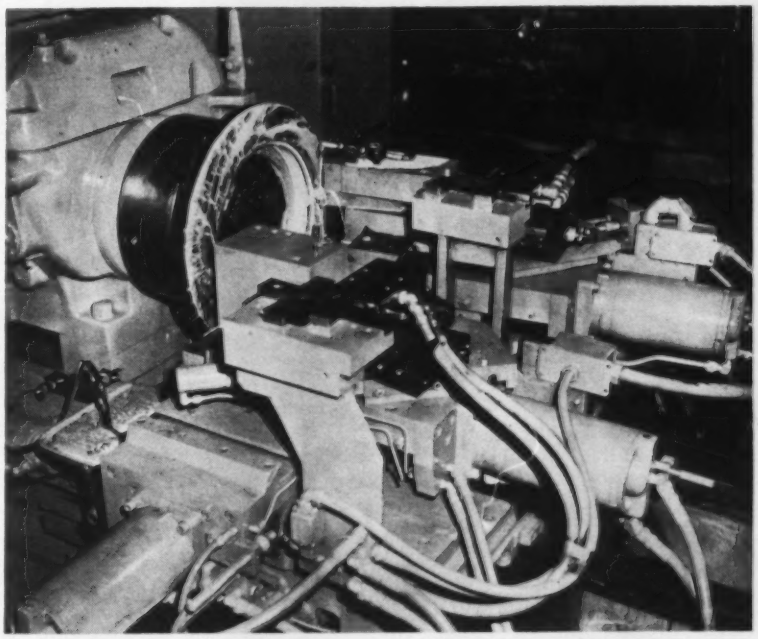
Previous die-grinding machines left a lot to be desired. Every die had to be hand finished after it emerged from the grinding machine. This tiresome chore took from 1-3 days.

Let's check out the new tracer system's flexibility. A large machine shop used conventional lathes to handle a difficult job. This shop kept eighteen of these costly lathes tooled up in a battery to machine each job-lot workrun.

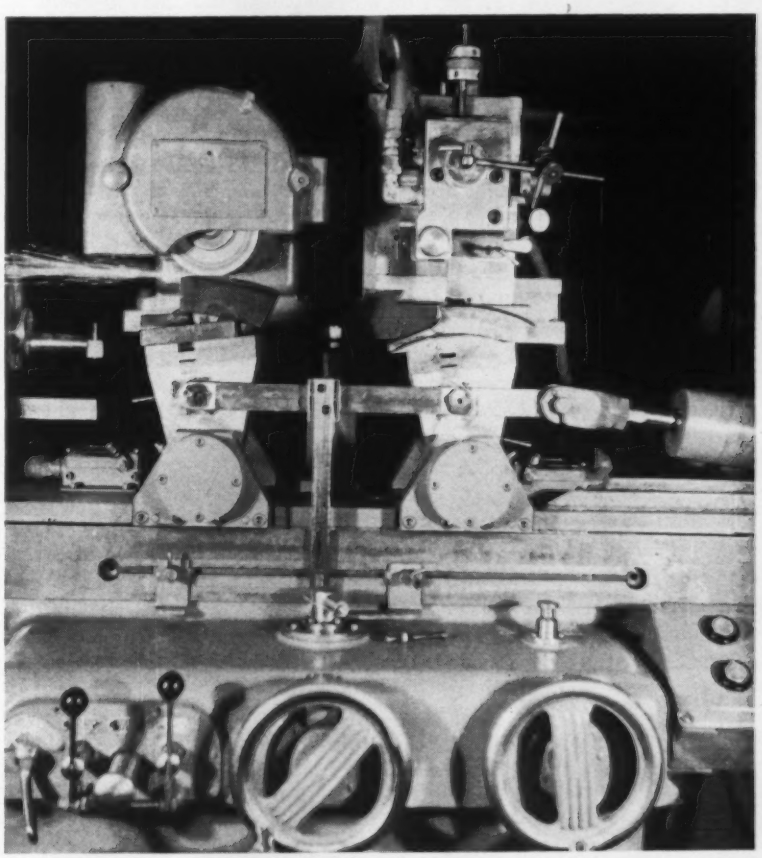
Don't Touch—The setup on each lathe was quite complex. Therefore, the company allowed these machine tools to sit idle almost 50 pct of the shops' working time—just to avoid costly tooling changeovers.

Recently, this company converted its shop to the new hydraulic-tracer system. Now, four highly-versatile machines do all of the work of the previously tooled-up eighteen.

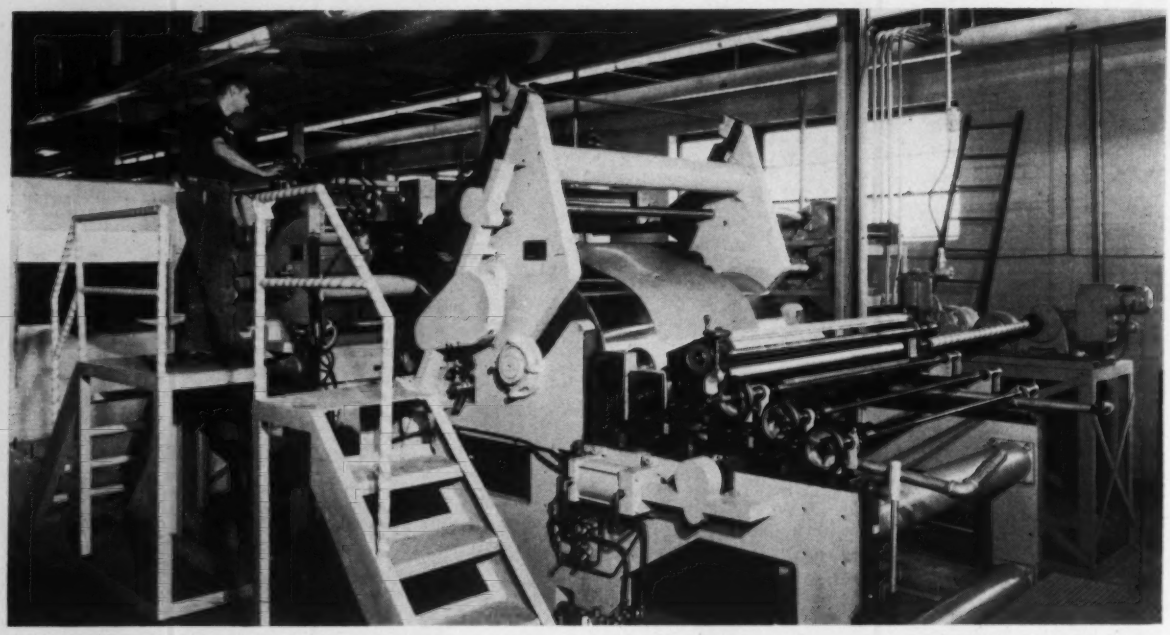
Most of the savings result from rapid changeovers. By switching templates, shop personnel obtain desired setups. As soon as a workrun is wrapped up, the modified lathes are open for other jobs.



FAST ACTION: Front and rear tracers team up to machine 24-in. diam gear rings. Complete machining time, including roughing and finishing of front-face shapes, takes only six minutes on a modified lathe.



GRINDS TIGHT TOLERANCES: Hydraulic tracer controls grinder. In 30 minutes, each complex die section is ground to 0.0005-in. tolerance.



ON THE LINE: Coils of metal are literally printed with an engineered coating on a modern finishing line.

Precoated Metal Gets New Line

In its infancy, the prefinish concept had to be pushed hard.

Now, prefinishing companies are building new metalcoating lines to meet the ever-increasing demand for their product.

▪ Key item in the production of precision-coated coil stock and sheet is the metalcoating line. This production facility comprises the heart of a prefinish plant. It must have built-in versatility to handle a wide variety of finishes.

At the same time, high-output capacity should also be inherent in the metal-precoating line. This is a tall order—but it can be met.

A Case in Point—At PreFinish Metals, Inc., Elk Grove Village, Ill., a new 450-ft metalcoating line is now in full operation. It's housed in a building wing erected specifically for this purpose. Company officials estimate the initial output of 350 tons per day can be exceeded without any difficulty at all.

Despite this high capacity, the line deals with a large number of finishes, shapes and sizes. Services include metal cleaning and treating and the application of functional coatings, lubricants, strippable-protective films and lithographed overall lettering.

The line single-coats or double-coats metal coils up to 48-in. wide, in gages from 0.004-0.062 in. It handles steel sheets 18-60 in. wide and 4-12 ft long, with gages varying from 0.012 in. to plate. A seven-stage cleaning and processing operation insures positive-coating adhesion and coating continuity.

Plenty of Finishes—Alkyds, vinyls, epoxies, acrylics, organsols and plastisols may be applied to the metal. And even newer materials are available. DuPont's Tedlar, Washington Steel Co.'s Color Rold, and Parker Rust Proof Co.'s Bonderite are good examples. Finishes include colors, wood-grain prints and embossed patterns.

These coatings can be applied to stainless, electro-galvanized, hot-dip galvanized, or cold-rolled steel. Aluminum, magnesium, zinc, phosphor bronze and brass also lend themselves to coating on Pre Finish Metals' advanced facilities.

In addition, this equipment will turn out round or coated edges, and precisely slit coils up to 48-in. wide. Metal can be supplied by the customer, or by the precoating company, whichever is preferred.

Quick and Easy—Only minutes are required for a 10,000-lb coil to feed from a payoff reel, go through all cleaning, treating and finishing operations, and be rewound. Then the coil is ready for shipment.

Another valuable service is experienced technical assistance in the selection of engineered finishes for specific products. Pre Finish chemists conduct continual laboratory research to provide necessary data on the properties of each finish.

Keystone Wire solves dairy brush forming and corrosion problems

Uniform wire softness is needed to perform brush twisting operations on high-speed twisting machines. To solve this problem, Keystone Steel & Wire Company developed for Regal Manufacturing Company, Fond du Lac, Wisc., a dead soft galvanized twisted Brush Handle Quality Wire. A special tight zinc coating is designed to adhere firmly during the severe twisting.

Regal Manufacturing Company specializes in making unusual brushes for the dairy and creamery industry—for example, the milking machine brush illustrated at left.

For filled brushes, galvanized stapling wire anchors crimped white nylon bristles into brush blocks of Super Hi-Impact plastic, hard rubber and hard wood. Regal uses Keystone's galvanized Stapling Quality Wire to resist corrosion from water and lactic acid.

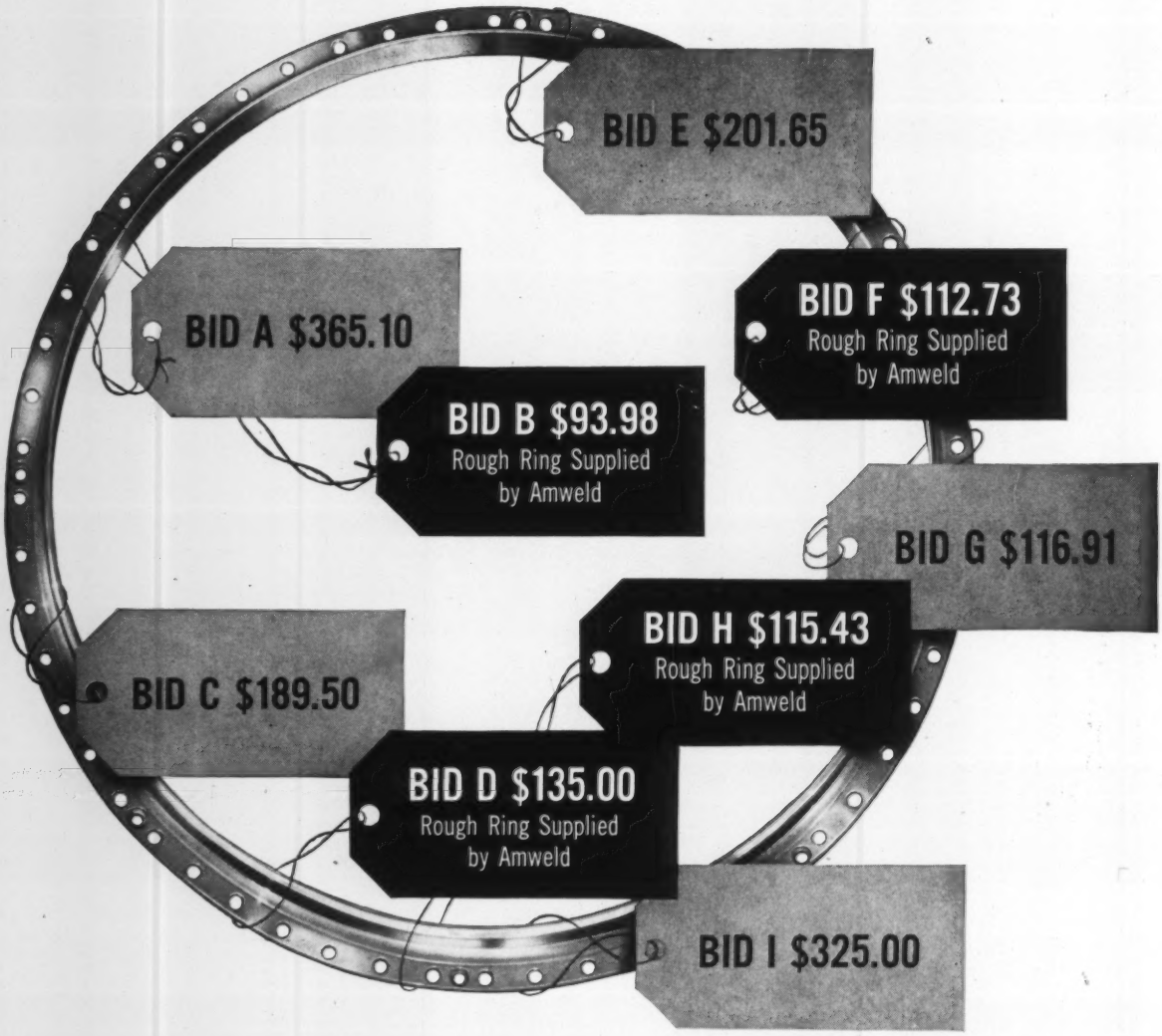
These quality wires are products of Keystone's Metallurgical Laboratories. If you make brushes or other wire formed products and want to improve them, tell us about your wire needs. We shall analyze your requirements and make the necessary recommendations.

Keystone Steel & Wire Company, Peoria, Illinois

KEYSTONE

WIRE FOR INDUSTRY

MADE AT PEORIA, ILLINOIS, U.S.A.



FOUR OUT OF FIVE LOW BIDDERS BASE QUOTES ON ROUGH RINGS BY AMWELD

Early this year nine companies submitted manufacturing bids ranging from $93.98 to $365.10 on this circular jet engine turbine shroud. **Four out of the five lowest bidders submitted their finished shroud quotation based on rough rings, flash butt-welded, furnished by Amweld.**

Whether you're bidding for military or commercial business, Amweld flash butt-welded rings can save you money—can help you get more business. The quality of Amweld rings has been proved repeatedly in jet engines and missiles. The cost reduction opportunity presented by Amweld rings enabled Amweld customers to save over $1,000,000 on circular components and assemblies last year alone.

Investigate now! Let Amweld review your circular component requirements and figure actual cost savings to you with Amweld flash butt-welded rings. Send your drawings and specifications today: The American Welding & Manufacturing Co., 703 Dietz Road, Warren, Ohio.

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Hot Galvanizing

"Hot Galvanizing — the Process and the Product," is the second in a new series of technical booklets to be issued by The Hot Dip Galvanizers Assn. It describes the process, including information on alloy layers, spangle, corrosion resistance, fabricating and methods of finishing.

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Lab Spectrometer

A six-page bulletin tells about the capabilities of an up-to-date mass spectrometer. The unit is a cycloidal-focusing instrument utilizing a cycloid tube with 1.1-in. focal distance and a permanent magnet charged to about 4500 gauss. (Consolidated Electrodynamics Corp.)

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Valves in Control

Control valves are the subject of a new 64-page bulletin. This comprehensive manual fully describes pneumatic - diaphragm and piston actuators, plus a wide variety of valve-body assemblies. Its 20-page specifying section contains all the necessary data for control - valve selection. (Fisher Governor Co.)

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Sensor Brochure

Case histories illustrate the diversified uses of a complete line of sensing devices. Examples include: Currency validation; strip-steel measurements; beta X-ray equipment on high speed production lines; and accurate measurements of sheet-rubber thickness. (Designers for Industry, Inc.)

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Quarterly Bulletin

The second issue of a quarterly bulletin, Nuclear/Space Materials has recently been released. Highlight of the issue is an article on the heavy, rare-earth industry. Another feature article covers various uses of a vacuum in the fabrication of special metals. (Dresser Products, Inc.)

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Buffing Manual

In 20 pages, a new technical manual presents data on abrasive polishing, burring, satin finishing, and high coloring of metals, plastics, wood and organic coatings on wood. (The Lea Mfg. Co.)

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Low-Alloy Steel

This booklet describes the many features of a unique, high-strength, low-alloy steel. The steel is available in a wide size and thickness range of hot- and cold - rolled sheets, plates, bars, small shapes, and structurals. (Jones Laughlin Steel Corp.)

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Dispensing Methods

Air-powered equipment is described as "the better way to dispense materials" in a new 32-page catalog. Various air-powered pumping systems are listed, as well as auxiliary equipment. (Lincoln Engineering Co.)

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Plastics Evaluated

Four pages, illustrated with 12 bar-graph charts, compare the properties of eight new "glamour" plas-

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FREE LITERATURE

tics in a new brochure. Graphs evaluate properties of the plastics, using more familiar plastics as points of reference. (Cadillac Plastic & Chemical Co.)

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Tolerance Rings

Here's a new catalog on an unusual fastener for bearings and other cylindrical members. In 18 pages, the new literature lists full dimensions for over 450 sizes of tolerance rings that are carried as stock items. Many typical uses are also listed. (Roller Bearing Co. of America)

For free copy circle No. 10 on postcard

Steel Shelving

Assembly features, component parts and practical advantages of the three basic types of steel shelving are described in a comprehensive new catalog. Photographs of many installations point out the many uses and space-saving advantages of each type. (Standard Pressed Steel Co.)

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Carton Machine

This new folder adopts the technique of "user reports" to explain the advantages of a semi-automatic, carton-forming machine. These reports detail actual benefits derived by customers in diverse industries. (United Shoe Machinery Corp.)

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Weld Wires and Rods

Recommended welding processes, and various welding wires and rods to meet the requirements of each process, are outlined in a new welding guide. A special table covers physical properties of the weld metal, for the ten, most-commonly-used, carbon-steel wires and the steels to which they are applied. (Linde Co.)

For free copy circle No. 13 on postcard

By-Pass Rotameters

Economical control of flow rates in pipe sizes up to 48 in. is claimed for by-pass rotameters in a new bulletin. The booklet is slanted toward engineers and designers who want complete information about capacity determination, flow-range data, piping requirements and accuracy. (Brooks Instrument Co., Inc.)

For free copy circle No. 14 on postcard

Research Separator

A new high-tension separator for research use is thoroughly described in a recently-released bulletin. Data on design characteristics, power requirements, operation and useage are included. (Carpco Research & Engineering, Inc.)

For free copy circle No. 15 on postcard

Three Books on Pipe

Three booklets cover Fibercast pipe, an epoxy-resin, glass-fiber, reinforced pipe. First of the trio is a corporate book that describes the product. The second details uses; while the third provides detailed specs and technical data. (Fibercast Co.)

For free copy circle No. 16 on postcard

Automatic Clutch

Here's an application-data folder that deals with automatic, adjustable, centrifugal clutches. It covers classes and ratings plus specs and dimensions for direct-drive, vee-belt and flat-belt units. (Olme Precision, Inc.)

For free copy circle No. 17 on postcard

Equipment for Winter

This 1961-62 catalog covers a complete line of oil-fired and LP gas-fired space heaters and salamanders, as well as steam thawers, thawing torches and a portable, hot-water heater for construction use. (Aeroil Products Company, Inc.)

For free copy circle No. 18 on postcard

Pumps Lick Corrosion

Just released is an eight-page brochure on centrifugal pumps designed for corrosive service. Complete performance curves and other technical data are included. (Industrial Filter & Pump Mfg. Co.)

For free copy circle No. 19 on postcard

Diamond Tools

Diamonds set in powdered metal are described as a new concept in diamond-tool engineering and design by a recently-released catalog. It covers a complete line of diamond-dressing tools that are fabricated by this method. (Koebel Diamond Tool Co.)

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NEW PATENTS

Improves Steel

Process for refining and improving the quality of steel and other ferrous metals, H. J. Hamlet, July 11, 1961. To eliminate gases and impurities during the production of steel, a slagging compound consisting of ⅓ raw-bone meal and ⅔ red-lava rock is introduced into the furnace charge in the plane of the slag line. U.S. 2,992,096.

Regulates Melting

Method of supervising metallurgical and metal-melting processes, F. Wever and W. Koch (assigned to Max-Planck-Institut fur Eisenforschung, Dusseldorf, Germany), July 11, 1961. In a process for supervising steel-melting processes, liberated gases glow as a result of a high-frequency discharge. This light emission is measured with a spectroscope. U.S. 2,991,684.

Vacuum Steel Treating

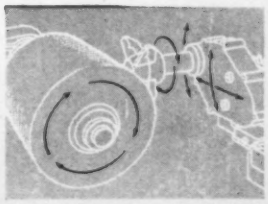
Method for treating steel in vacuum, M. Allard (assigned to Institut de Recherches de la Siderurgie, Saint - Germain - en - Laye, France), July 25, 1961. In the production of steel, the liquid steel is skimmed, bath depth decreases without heat loss, and bubbles of an inert gas are blown through the bath, when a vacuum is applied to the vessel. U. S. 2,993,780.

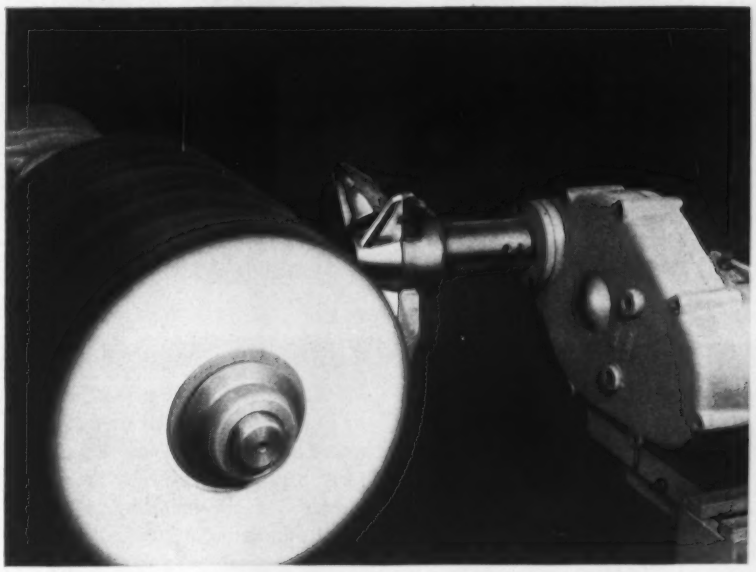
Reducing Process

Process of reducing metal oxides, T. Basen and F. C. Collin (assigned to Elektrokemisk A/S, Oslo, Norway), July 25, 1961. Concerns a method for balancing reaction conditions in a vertical-shaft kiln used for reducing porous agglomerates of iron, chromite, or manganese ores. The technique prevents overheating sintering, and hanging of the charge in the shaft. U. S. 2,993,779.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.

ACME IN ACTION



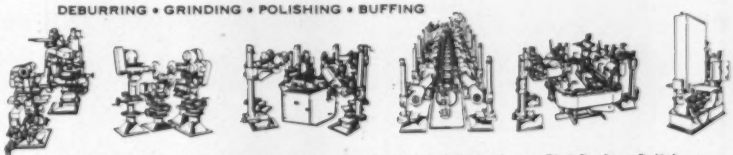


Doing more work with
Movement and Motion

The die-cast part being "mush" buffed above happens to be an automotive accessory having recessed, contoured surfaces. But it could be almost any other type of limited production part presenting similar finishing problems because the equipment performing the operation is a versatile Acme Semi-Automatic Polishing and Buffing Machine. Note that the ruggedly built work holding unit has an adjustable horizontal stroke that distributes wear evenly across the buffing wheel. Note, too, that the exclusive Acme oscillating head attachment simultaneously rotates the part and moves it vertically above and below the center line of the wheel to assure maximum coverage, greater uniformity of finish. Matter of fact, this unique combination of movements and motions—this added Acme action—does so much more work so much better that two operations can often be combined into one!

Want complete information about this and other Acme semi-automatic finishing equipment? A catalog is yours for the asking.

DEBURRING • GRINDING • POLISHING • BUFFING



Semi-Automatics Rotary Automatics Straight Line Automatics Flat Surface Polishers

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ACME MANUFACTURING COMPANY

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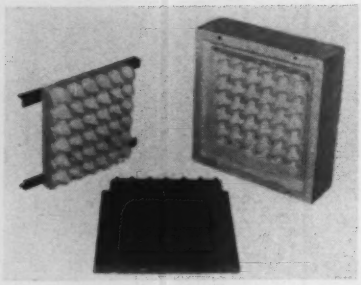
Leading Producers of Automatic Polishing, Buffing and Deburring Machines Since 1910

New Materials and Components



Low-Cost Mold Material Cures in 2-4 Hours

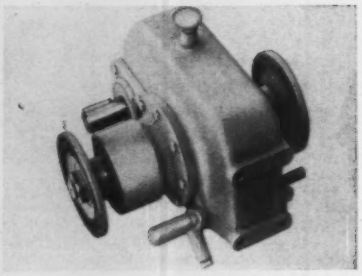
Here's a new low-cost method for producing molds and models. It teams up high-performance epoxy compound and silica sand. These ingredients are mixed together and cured at room temperature. The result is a tough, dimensionally-stable mold that is ready to use in four hours. Drying and sealing aren't required. Once it's dry and set in the shape of the model, the new material resists cracking, peeling, chipping and gouging. Strength of the mold varies inversely with its sand content. (Hysol Corp.)

For more data circle No. 21 on postcard, p. 115

Teflon Encapsulates Metal-Ball Valve and Stem

This new ball valve is an attempt to provide a universal unit that fits a broad range of uses. It particularly suits the process industries where efficient handling of gases, liquids and viscous ladings is a must. Economy and ease of upkeep result from the use of a new sealing capsule. This is a conically-shaped Teflon unit that contains a metal ball. The one-piece metal ball and its stem are pressure-molded within the Teflon. Despite only microscopic clearance between the two, the ball turns freely within the capsule. In effect, all sealing and flow-control features are embodied in the contact between metal ball and Teflon. Thus, valve, body, handle, screw-in base plate, lock nut, set screw and a small washer are the only other parts used in the new design. These valves have cycled 500,000 times without visible wear. (ACF Industries, Inc.)

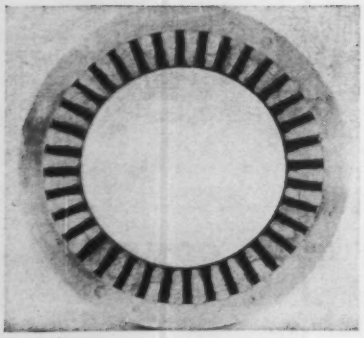
For more data circle No. 22 on postcard, p. 115



Power Take-Off Units Handle the Heavy Loads

This split-shaft, power take-off drives truck accessories whenever loads are too large for side-mounted. units. Rugged construction lets the newcomers deliver full-engine power up to 5050 ft lb of torque. In a compact model with a one-piece housing, gear ratios of 146-61.5 pct of engine speed are standard. However, other ratios are available. Also, the units come in a wide choice of models for various uses. Their straight, splined, or tapered shafts extend to the front, rear, or both. (Hale Fire Pump Co.)

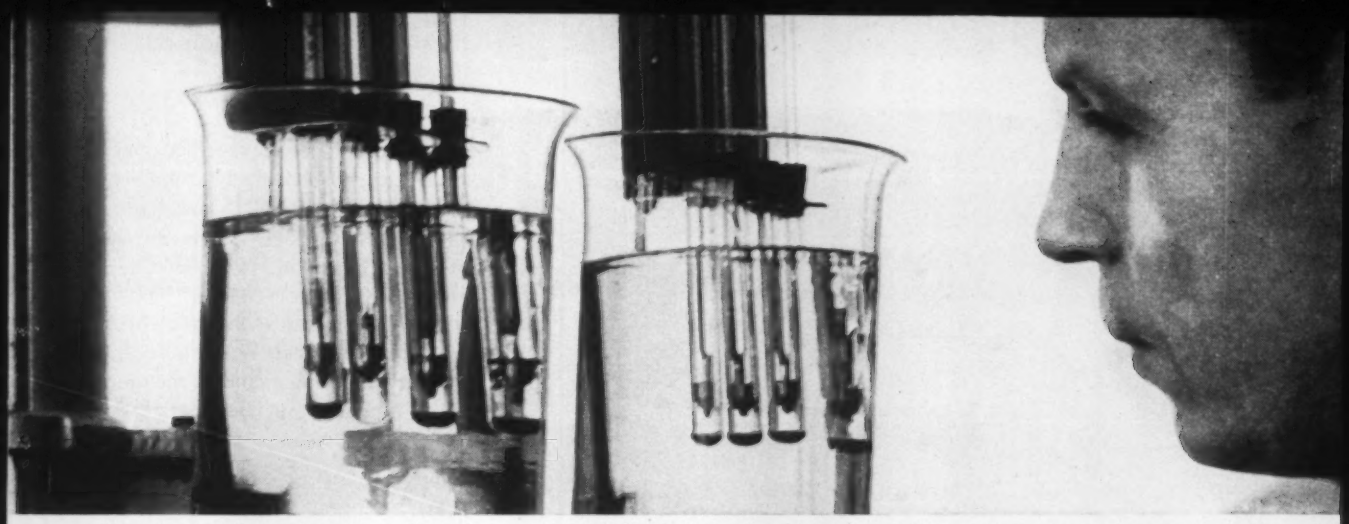
For more data circle No. 23 on postcard, p. 115



Motor Components Use Shrink-Fitted Laminations

Induction-wound, rotor and stator components now come in Closed Bore motor design. Unlike conventional units, these components use two matching laminations in the stator. The main lamination (spider) is automatically wound and insulated on its periphery. This results in a completely-closed bore. Shrink fitting a laminated ring (yoke) over the wound spider completes the stator construction. The components are available in all induction windings, and in special sizes and ratings. Thus, they can be precisely tailored to a particular application. A good example is a 5 7/8-in. OD stator that develops 20 hp. (EMD Components, Inc.)

For more data circle No. 24 on postcard, p. 115



Dropping point test shows how greases react to heat. Beaker fluid has been heated to 390°F. All greases tested except Darina (second tube from left) have passed from solid to liquid state.

BULLETIN:

Shell reveals the remarkable new component in Darina Grease that helps it save up to 35% on grease and labor costs

Darina® Grease is made with Microgel*, the new thickening agent developed by Shell Research.

Darina lubricates effectively at temperatures 100° hotter than most conventional soap base greases can withstand.

Read how this new multi-purpose industrial grease can help solve your lubricating problems and even save you up to 35% on grease and labor costs.

THERE IS no soap in Darina Grease. No soap to melt away—wash away—or dissolve away.

Instead of soap, Darina uses Microgel—a grease component developed by Shell Research.

What Microgel does

Because of Microgel, Darina has no melting point. It won't run out of gears or bearings.

Compared with most conventional soap-base greases, Darina provides significantly greater protection under adverse service conditions.

Mix water into Darina and the grease does not soften. It shrugs off water—won't emulsify.

Resists heat

Darina will withstand operating temperatures 100° hotter than most conventional multi-purpose greases. It cuts leakage and reduces the need for special high-temperature greases.

Also, Darina resists slumping, thus forming a more effective seal against foreign matter.

Saves money

Shell Darina can reduce maintenance expenses while it protects your machinery. Savings of up to 35% on grease and labor are quite possible.

In some cases lubrication intervals have been extended to double what they were before. Less grease is consumed and less time consumed applying it.

For details, see your Shell Representative. Or write: Shell Oil Company, 50 West 50th Street, New York 20, New York.

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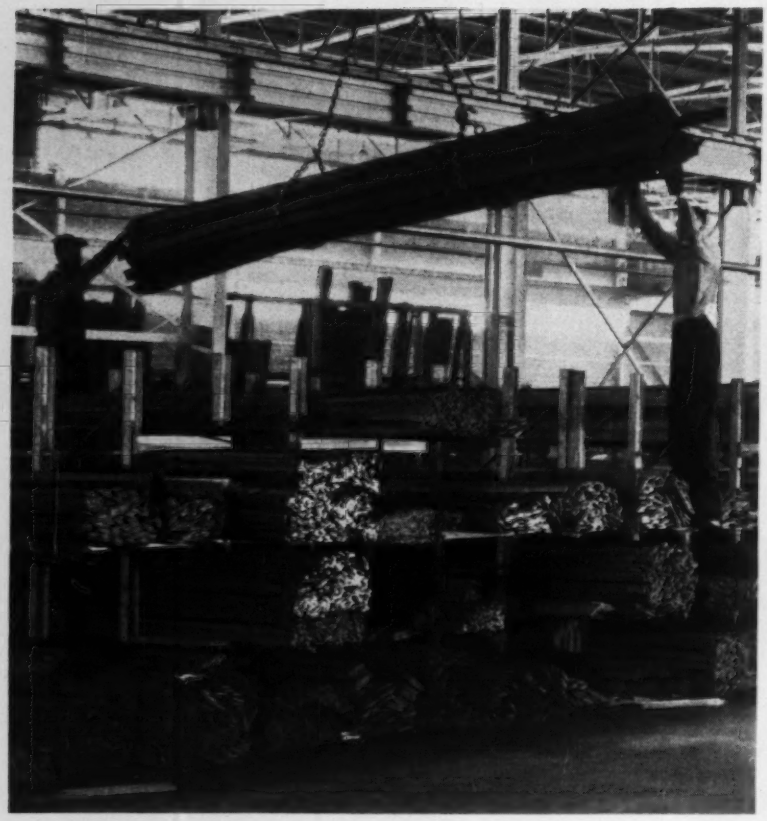
SHELL

A BULLETIN FROM SHELL
—where 1,997 scientists are helping to provide better products for industry



"MUSICAL CHAIRS" PLAYED WITH STEEL... sour note in cost of possession

The rumble of an overhead crane . . . the klaxon on a fork lift . . . the silence of a machine tool not operating . . . while the right bars of steel are uncovered from the bottom of the stock pile.

All this loses money . . . and time . . . and production. It's a part of your *cost of possession.*

Here's how to greatly reduce the dead-loss cost of handling and re-handling steel stocks . . .

Call on your nearby steel service center for steel delivered when you need it, to the plant dock handy to the machines that will process it, ready to use without delay.

To help your production and cost accounting people in figuring the true cost of steel stocks, ask your steel service center salesman for the booklet, *What's Your Real Cost of Possession for Steel?* Or write to Steel Service Center Institute.

COST OF POSSESSION . . . *to determine your own cost of possession for steel in inventory, consider all these factors:*

Cost of capital: inventory, space, equipment—Cost of operation: space, material handling, cutting and burning, scrap and wastage—Other costs: obsolescence, insurance, taxes, accounting

YOUR STEEL SERVICE CENTER

STEEL SERVICE CENTER INSTITUTE

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Convenient to every steel user, steel service centers are customer-oriented, technically competent, fully equipped for fast delivery of steel in any type, form, and quantity.

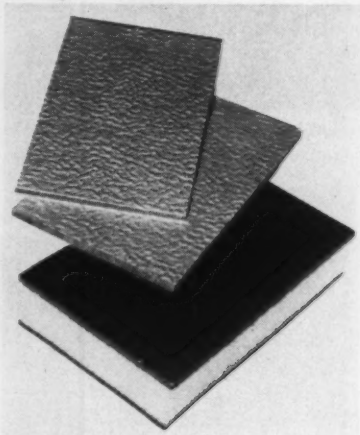
Steel

STEEL SERVICE CENTER INSTITUTE

DESIGN DIGEST

Aluminum Panels

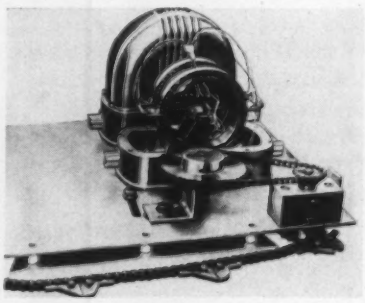
Porcelain-finished aluminum panels are available with stucco-embossed textures. These lightweight panels can substitute for porcelain-steel panels in most cases. And the porcelain-enameled aluminum stands up under a surprising amount of abuse. Other advantages include the facts that the new panels can be sawed, drilled and/or punched without chipping or spalling the porcelain coatings. (Mapes & Co.)



For more data Circle No. 25 on postcard, p. 115

Memory Timer

An electromechanical memory timer insures precise control for a variety of applications. It can even be used on spray-finishing systems. This new timer is similar in construction to a large ball bearing. Basic components include: A drive gear; a timing-ring gear with two channels (similar to bearing races); 132 steel balls which take input signals, store them and transmit output



signals; a flipper gate that controls the ball movements; and microswitches which convert the balls' mechanical action into an electrical signal. A cast-aluminum housing and wiring harness with multiple-pin connector complete the basic elements. (Binks Mfg. Co.)

For more data circle No. 26 on postcard, p. 115

Bans Flaws in Ingots

An inexpensive additive prevents flaws in stainless-steel and other alloy ingots. During pouring, the formulation purges out oxygen and hydrogen. This minimizes scalding and pitting. As a result, you get more homogeneous ingots and fewer rejects due to internal flaws or surface imperfections. The additive comes in granular or molded-ring form. It's both inexpensive and extremely easy to use. Simply drop in a conveniently-packaged 4-oz

dose into the mold for every 500 lb of metal being poured. The additive's chemical reaction does the rest. (Crane Packing Co.)

For more data circle No. 27 on postcard, p. 115

Grinding Attachment

Until recently, problems of reciprocating table motion, interrupted surfaces and extremely-rough conditions have defied accurate gaging control. However, with this new gage amplifier, workpieces can actually traverse or rotate under the gaging anvil and produce highly-accurate, machine-control signals. High speeds and holes or steps in the workpiece don't affect accuracy. The electronic gage selects the major dimension only. Since gage cir-

FAST DELIVERY...LOCAL STOCKS

A time-saving benefit offered by your steel service center

The right steel at the right time . . . when you want it, where you need it . . . because steel service center stocks are located near you. And are delivered directly to the right production area of your plant by the fastest means.

The proper steel for the particular job . . . no make-do with not-quite-right steel that uses up machine time and man-hours to make it almost fit the job.

Your nearby steel service center is customer-oriented . . . is interested in your problems and needs, and provides neighborly service. He reduces your "cost of possession" for steel, too. Call on him for help in improving production, quality, delivery, and price of your product.

YOUR STEEL SERVICE CENTER

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Convenient to every steel user, steel service centers are customer-oriented, technically competent, fully equipped for fast delivery of steel in any type, form, and quantity.

Steel

STEEL SERVICE CENTER INSTITUTE

cuitry ties in with the existing-grinder hydraulic or electrical circuit, setup time is practically eliminated. The desired dwell and final size is simply dialed in on the calibrated console control knobs. (Electro-Autosizing Machine Corp.)

For more data circle No. 28 on postcard, p. 115

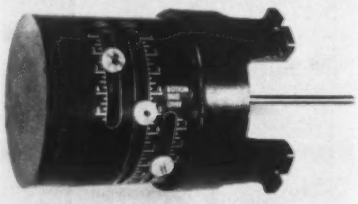
Corrosion Inhibitor

An oil-soluble corrosion-inhibiting concentrate offers protection from rust for parts, assemblies and end products. Called Nopcochex D, this new product can be mixed with water, conventional oils or solvents to prepare different types of rust preventives. Then the various blends can be applied by brushing, dipping, spraying or slushing. The new concentrate is highly effective in the treatment of bar stock, sheet steel, machine tools, storage tanks and in the final-tumbling operations of ferrous-metal parts. (Nopco Chemical Co.)

For more data circle No. 29 on postcard, p. 115

Rotary Cam Switch

A multi-stage cam switch is available with from one to six cams. The adjustment range is up to 180° for each stage. All adjustments can be made quickly from the outside—while the cams are stationary or in motion. This new switch is designed primarily for any type of commercial equipment where a synchronous pulse or series of pulses is required. As an optional feature, you can obtain switches



which will not trip upon reversal. All of these switches are rated at 15 amp up to 480-v ac. (General Automation Corp.)

For more data circle No. 30 on postcard, p. 115

Reliable Timers

Manually adjustable for intervals of five seconds to five hours, a new series of timers boasts reliability and long life. According to company engineers, the series is a simplified version of highly-reliable timers designed for military use. These units were adapted to commercial use without surrendering any of the ruggedness or precision of the military version. The newcomers operate as a time-delay mechanism, or as a straight-interval timer. Alternate methods of field

WARD
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SPRING STEEL
AMERICA'S LEADING SUPPLIER
Where
SERVICE and QUALITY
is the rule
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DYKEM STEEL BLUE®
Stops Losses making Dies and Templates
Popular package is 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench: metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.
Write for sample on company letterhead
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Without DYKEM Steel Blue
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Use Rubyfluid soldering flux. Fast acting . . . easy to use . . . wets out freely . . . insures strong unions. Ask your jobber or write for special $1.00 offer.
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END NIGHT CLEANUP & MORNING REBLUING
DYKEM HI-SPOT BLUE No. 107 is used to locate high spots when scraping bearing surfaces. As it does not dry, it remains in condition on work indefinitely, saving scraper's time. Intensely blue, smooth paste spreads thin, transfers clearly. No grit; noninjurious to metal. Uniform. Available in collapsible tubes of three sizes. Order from your supplier. Write for free sample tube on company letterhead.
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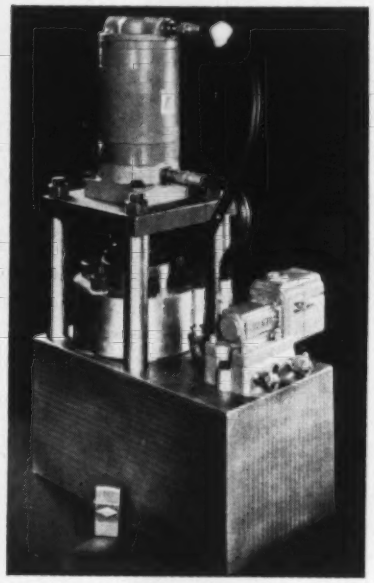
GOSS and DE LEEUW
MULTIPLE SPINDLE
CHUCKING MACHINES
Tool Rotating
GOSS & DE LEEUW MACHINE CO., KENSINGTON, CONN.

wiring allow you to control power duration, or the delay period before the power's applied. (The A. W. Haydon Co.)

For more data circle No. 31 on postcard, p. 115

Pressure Valves

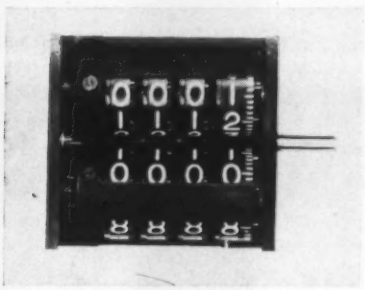
High-pressure water valves prove ideal for hydrostatic pipe testers. Tungsten carbide is used in the valve seats. The trim is stainless steel. This new line of valves handles water-service pressures up to 15,000 psi. (Hydraulic Machinery Corp.)



For more data circle No. 55 on postcard, p. 115

Digital Counters

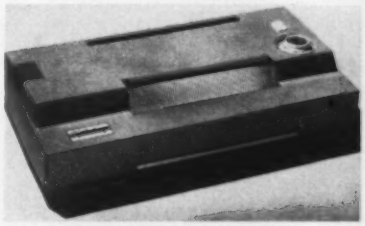
Direct-drive mechanical counters fill applications where plus or minus, right or left, or directional readings are needed. A versatile new line of counters feature high-speed response and low-torque requirements. This new counter line is available with from two to seven figures. A wide variety of unit-wheel configurations, white on black, includes: 0-9; 0-9 with 50 graduations; 00-99 with 50 graduations. (Veeder-Root Inc.)



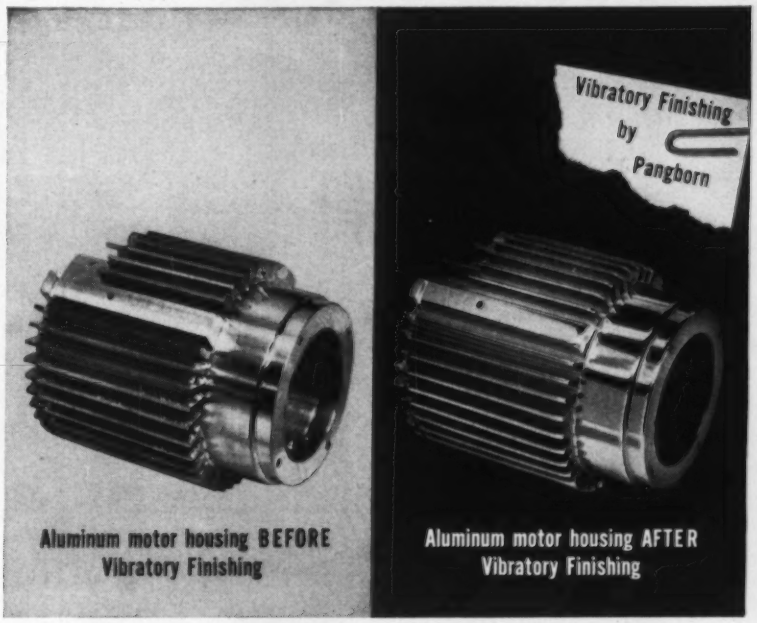
For more data circle No. 32 on postcard, p. 115

Textured Metal Trim

Product saleability hinges on both performance and appearance. For this reason, today's designer strives for basic-engineering excellence in smart, streamlined packages. Along with obvious esthetic advantages for almost all products, textured metals boast strength advantages.



They increase the strength and rigidity of the plain flat metal. This often permits the use of lighter,



Amazing, how inexpensive complex finishing can be!

In some cases, the Pangborn Vibratory Finishing Machine has reduced finishing time by over 90%. You know what this means in time and labor savings alone. Especially since this machine tackles complex finishing assignments with the same ease and speed as simple ones.

Its uses are amazing, too. It descales, deburrs, burnishes, radiuses, fine-finishes. It handles a wide variety of materials . . . metals, plastics and ceramics. And this machine tackles complex and difficult jobs impossible or impractical to do by other methods . . . and does them quickly and economically.

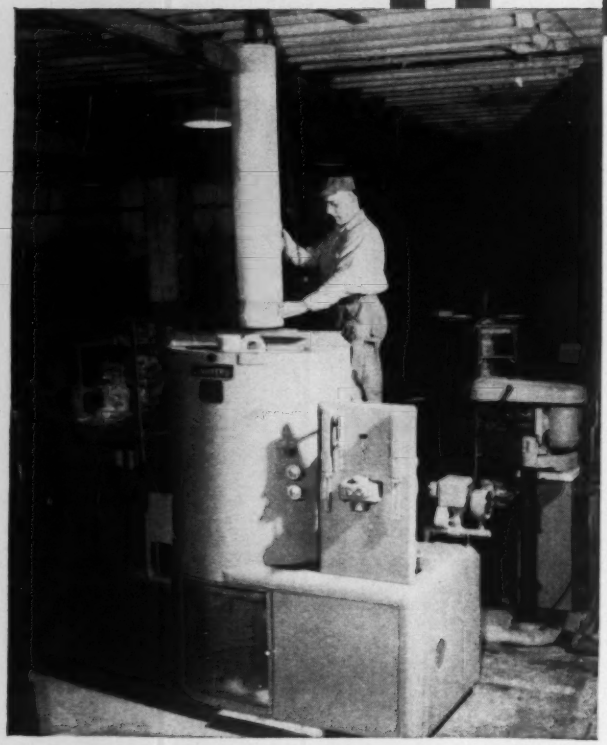
The exclusive air-cushioning system built into every Pangborn Vibratory Finishing Machine provides better and closer amplitude control and offers automatic adjustment for any weight load. Air-cushioned floor mounts eliminate any transmitted vibration. No special foundations are necessary. Variable speed controls available on all models. Automated and auxiliary equipment, media, compounds for every need. Send parts with exact finish specifications or finished specimen for sample processing in our laboratory to Mr. William Brandt at:

PANGBORN CORPORATION, 1500 Pangborn Blvd., Hagerstown, Md., Pangborn Canada, Ltd., 47 Shaft Rd., Toronto (Rexdale), Canada—*Manufacturers of Vibratory Finishing, Blast Cleaning, Dust and Fume Control Equipment; Rotoblast® Steel Shot and Grit®.*

Pangborn
OF HAGERSTOWN

DURALOY HOM

Covered by U.S. Patents



Do your high alloy castings show a tendency to sag at 1800 to 2200°F? Is the operation important enough to use an alloy that stays firm at that temperature range?

Then HOM is your casting requirement. It would take an unusually heavy load to deform this metal. It was developed by Duraloy metallurgists to be usable over that high temperature range—another milestone in the ever broadening services available to industry through Duraloy.

Why not discuss your extra high temperature problem with our metallurgical staff? Send for Bulletin G-159.

THE DURALOY Company

OFFICE AND PLANT: Scottdale, Pa.

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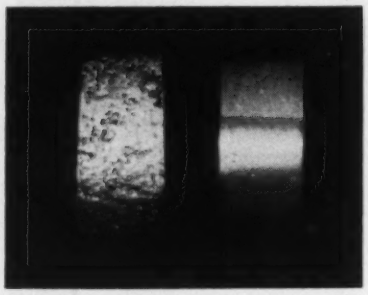
DETROIT OFFICE: 1025 Maple Road, Troy, Michigan
HOUSTON OFFICE: 4101 San Jacinto, Houston 4, Texas

more economical gages. The texture also provides optimum resistance to scuffing and marring. (Ardmore Products, Inc.)

For more data circle No. 33 on postcard, p. 115

Bar Solder

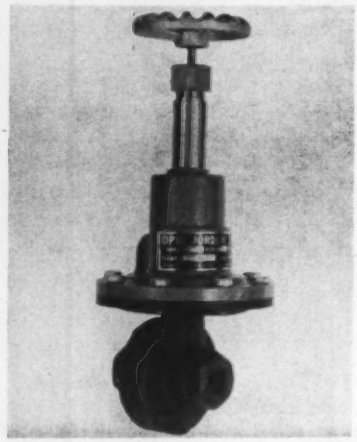
A new bar solder cuts printed-circuit rejects from 8 in 400 to only 1 in 5000. Photomicrographs indicate that it's freer from oxide-forming elements than other commercially-made solders. As a result, the new solder cuts dross, boosts bath life, reduces inherent inclusions, improves wetting and yields brighter joints. Unit prices vary with quantity. (Alpha Metals, Inc.)



For more data circle No. 34 on postcard, p. 115

Regulates Pressure

A new differential-pressure regulator is available from stock in ductile iron or bronze. It comes in ¼, ⅜, ½ and ¾ in. sizes. The regulator maintains a constant differential between a medium passing through it, and any other medium loaded on



Quality in Ascendancy

The superiority of the vast number of products that are — and can be made from Roebling Cold Rolled Flat Spring Steel is a fact known throughout all industry.

You pay for mechanical and dimensional uniformity when you buy flat spring steel . . . you get it when you buy Roebling.

For information on how our products can help yours, write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

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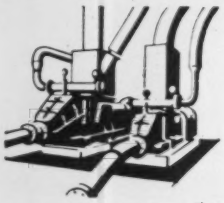
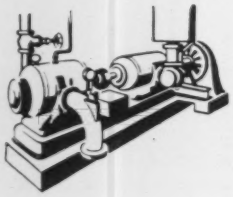
Roebling... Your Product is Better for it

FULLER EQUIPMENT

for the process industries

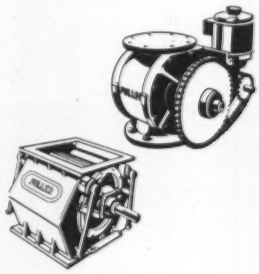


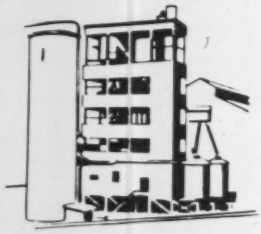
Pneumatic Materials Handling Systems. Widely specified throughout the process industries, Fuller's range of equipment offers best single source for solving problems in moving dry bulk materials pneumatically. Fuller-Kinyon Pumping Systems, Airveyor® Pressure and Vacuum Conveying Systems, and F-H Airslide® Fluidizing Conveyors are completely sealed to prevent both contamination of the product and any leakage of dust, etc., into the surrounding area. They are used to move dry, granular and pulverized materials to and from cars, ships, trailers, storage and processing points.



Fuller Rotary Compressors and Vacuum Pumps are vibration-free, can be installed anywhere, even on balconies. Fewer moving parts mean minimum maintenance. Compressors and Vacuum Pumps handle air and gases from 30 to 3300 cfm at pressures to 125 lb. gage. Vacuums to 29.95 in. (referred to 30-in. barometer).

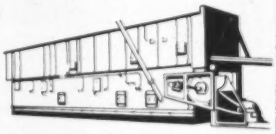
Fuller Vane-type and Roll Feeders . . . for volumetrically controlled feeding of a wide range of dry pulverized or granular materials. Also Fuller Rotary Valves . . . used under silo deck slabs and bins to permit the free flow of pulverized materials which tend to arch, such as lime and cement raw materials.





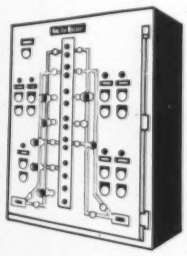
Fuller Preheaters, Humboldt Suspension Type . . . for preheating dry, pulverized Portland cement raw materials with rotary kiln waste gases.

Fuller Horizontal and Inclined Grate Coolers are compact, easily installed for fast, efficient cooling of materials such as nodulized phosphate rock, pebble lime, ores, dolomite, iron nodules and Portland cement clinker from 2800°F. or higher to any desired point within a reasonable range of atmospheric temperature.



Fuller-Material-Level Indicators signal audibly and visibly when materials reach a predetermined high or low level. Controls conveyor motors, valve circuits, etc.

Fuller Control Panels permit automatic, remote, one-man control of multiple operations. Easily-read panel permits visualizing flow of material to storage or from process bins.



Fuller equipment is designed to help give you maximum efficiency at minimum cost. Send today for more detailed literature.

1356
G-210

FULLER COMPANY GENERAL AMERICAN TRADE MARK

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Offices in Principal Cities Throughout the World

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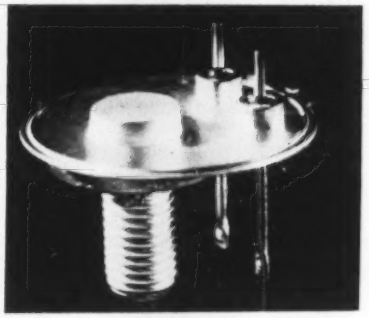
. . . . pioneers in harnessing AIR

top of the diaphragm. It enjoys wide usage in the paper, chemical and other processing industries. Steam, water, air, oil, gas or chemicals pose no problem for the newcomer. In addition, the units handle 250 psi at 450°F, and 300 psi at 150°F. Self-cleaning, stainless-steel valves are standard along with all-metal construction. (OPW-Jordan Co.)

For more data circle No. 35 on postcard, p. 115

Semiconductor Bases

An expanded line of semiconductor-base assemblies come with virtually all brazing and plating operations completed. Pre-assembly includes the joining of such parts as



glass-sealed pin terminals, weld rings, base plates and threaded-copper heat sinks. (Standard Pressed Steel Co.)

For more data circle No. 36 on postcard, p. 115

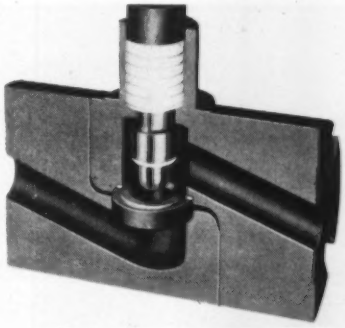
Holds the Workpiece

Open construction allows the workpiece to pass completely through the body of a new work-holding chuck. Once an air supply is applied to the inlet valve on the chuck body, the chuck jaws activate. Now disconnect the air; the chuck housing retains the air pressure. This means the chuck can travel in any manner along with the machine it's mounted on. There are no encumbering air lines. (Mollenberg-Betz Machine Co.)

For more data circle No. 37 on postcard, p. 115

Graphite Valves

Designed for highly-corrosive service, or where thermal shock is a factor, single-seated control valves utilize impervious graphite in their split-body construction. Impervious

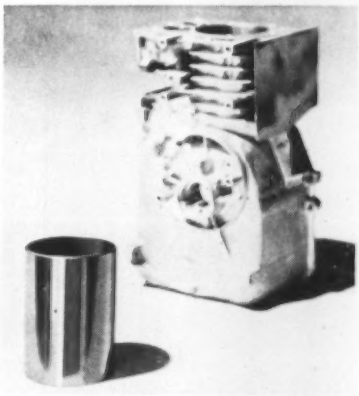


graphite resists most corrosive agents except for a few highly-oxidizing types. It also stops contamination of in-process material. Each valve has studs with standard ASA flange mountings. Recommended operating temperatures range up to 340°F, at pressures to 75 psi. Teflon-to-graphite seating insures positive closures. Valve bodies are furnished in 1 and 1½ in. sizes. Valve port diameters range from ½-1½ in. (Falls Industries, Inc.)

For more data circle No. 38 on postcard, p. 115

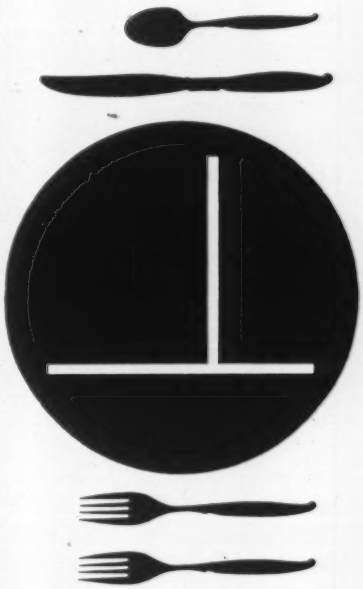
Cylinder Liners

Longer engine life and a reduction in oil consumption by almost 70 pct are promised by a new line of powdered-metal cylinder liners. Ideally adapted for small two- and four-cycle engines, the new liners re-



duce ring wear. Here's an example. After a 500-hour test at full throttle, machining marks on an engine's rings were still clearly visible. (Amplex Div., Chrysler Corp.)

For more data circle No. 39 on postcard, p. 115



Look Ahead...

. . . to Allegheny Stainless at work in the Food Service industry. See what Allegheny Stainless can do for you . . . for your customers.

Because stainless steel is synonymous with cleanliness, advertising such as appears on the next two pages works for you. It helps you to sell your products and services in an industry where cleanliness is a must. Check this ad which also appears in the current issues of CHAIN STORE AGE, FAST FOOD, INSTITUTIONS, as well as IRON AGE, and STEEL.

It's just another example of how Allegheny Stainless can work for you . . . in your products . . . in your markets . . . in your merchandising efforts.

3582

BEHIND EVERY

quality kitchen equipment of Stainless Steel

Back where the meals are prepared is where Stainless Steel shines.

Because that's what stainless is made for.

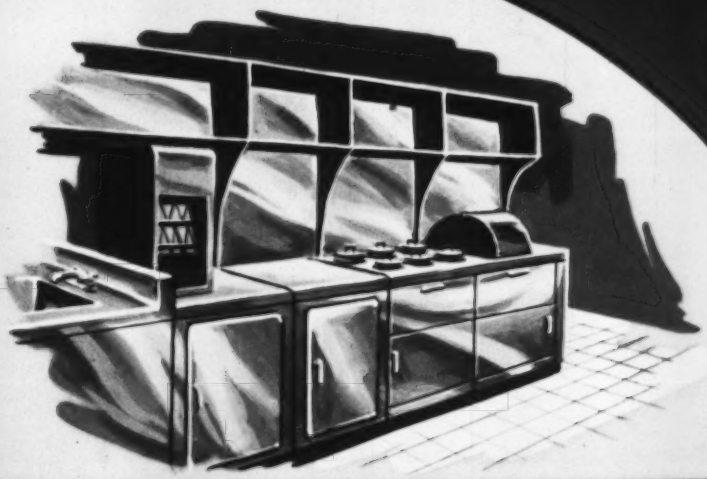
Because it's smooth and dense, easy and efficient to work on . . . because it smiles right through the harshest kitchen acids and hottest greasy spills.

Because it's hard and tough to resist the scrape of heavy pots and pans, the clatter and batter of cutlery and utensils. And, because it's *stainless*, it can be cleaned . . . really cleaned . . . easier than any other metal. It's traditional in sanitation standards.

When you think about it, food service means stainless. When you know about it, stainless means Allegheny Ludlum.

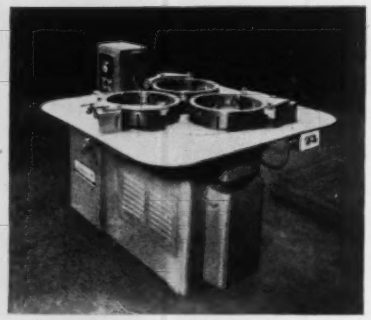
The symbol of added value—look for it when you buy

SERVING—



AL ALLEGHENY LUDLUM

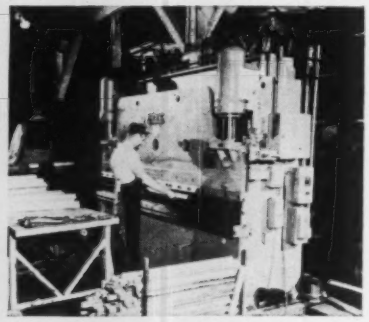
New Equipment and Machinery



Production-Lapping Unit Holds Tight Tolerances

A host of new features distinguish this advanced model of a production-lapping machine. This up-to-date version includes an abrasive distribution system that maintains the correct mixture of compound to vehicle, from initial filling to last drop. Constant-head pressure pumping insures a uniform deposit at each lapping station. It also provides adjustable flow control for maximum stock removal. Pump and tank mount inside a door in the machine base. This door swings out for filling ease, but during production it's out of the way. Production tolerances are within one light band; finishes are within 2-3 microinches. (Crane Packing Co.)

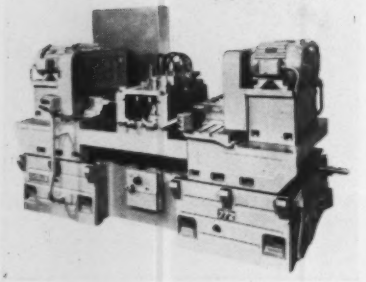
For more data circle No. 40 on postcard, p. 115



Hydraulic Press Brake Forms Diversified Products

Versatility is the big attraction on a new hydraulic press brake. It eliminates the need for specialized machinery in widely-diversified production forming. Quick and economical setups let the newcomer form a wide variety of unusual products using 24-gage sheet to ½-in. plate. With six-station, micrometer-depth stops on the adjustable stroke length, the press brake forms several different bends from one die set. As an example, it forms 400 U-channels per hour from 18-gage steel. Dimensions are 48-in. long x 4⅞-in. wide. The same dies form W-shaped fins from 24-gage steel, 48-in. long x 4-in. wide. (Pacific Industrial Mfg. Co.)

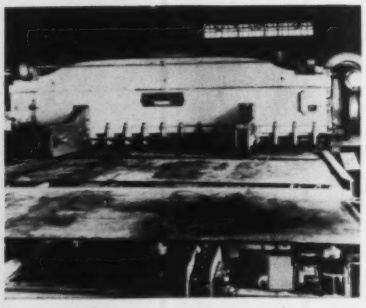
For more data circle No. 41 on postcard, p. 115



Boring Unit Machines Five Cylinder Heads at Once

This standard precision-boring machine features a setup developed to accept five different types of cylinder heads. It handles either four- or six-cylinder versions, with a minimum of changeover time. Two of the five heads are processed at the left-hand end of the machine. The other three are machined at the right-hand end. Standard equipment is 12 boring spindles. When a four-cylinder head is scheduled for machining, changeover from six-cylinder production merely involves the removal of two boring quills. Production rate equals 23 parts per hour. (Ex-Cell-O Corp.)

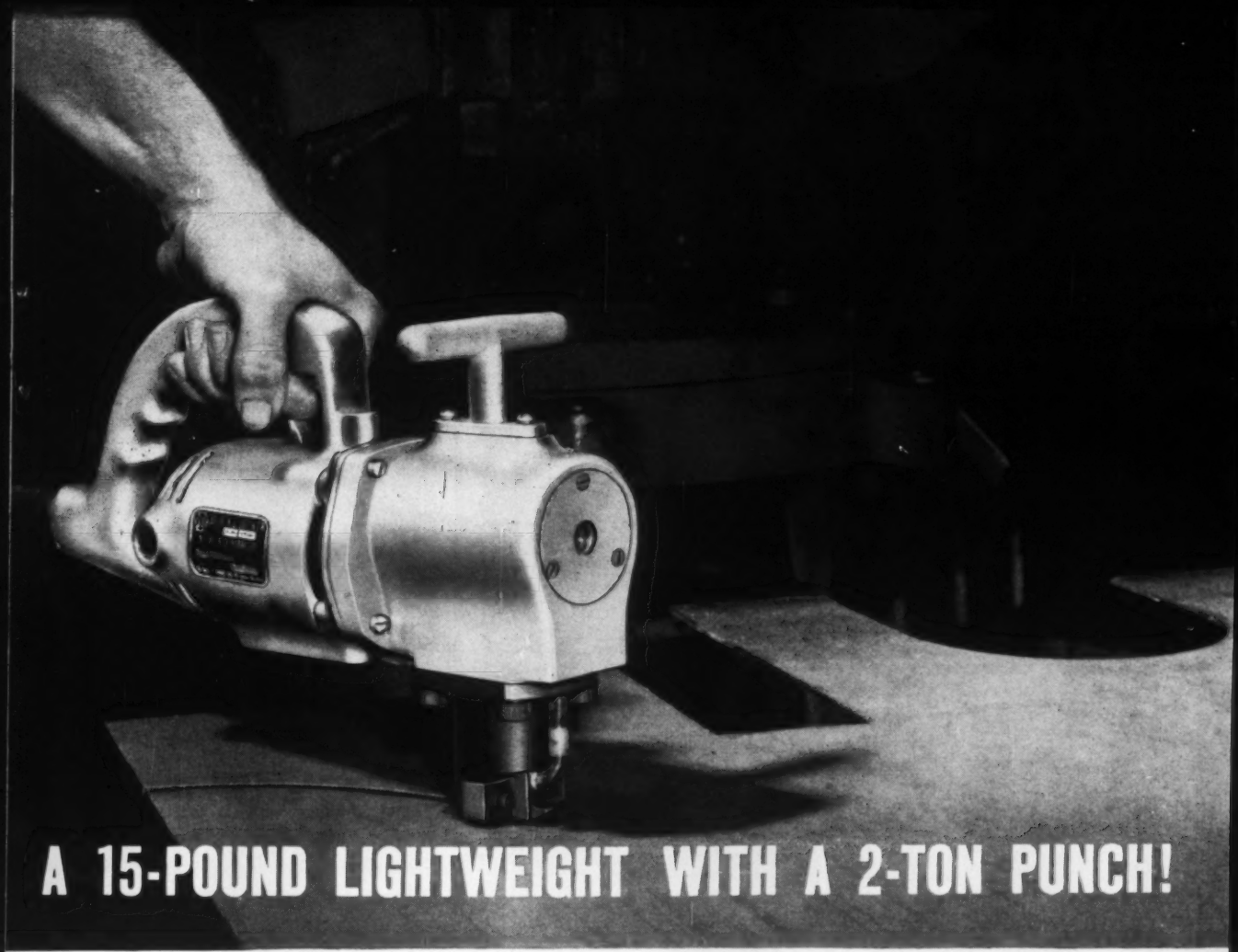
For more data circle No. 42 on postcard, p. 115



Steel-Shearing Machine Features Automatic Feed

Automatic handling devices simplify cut-off of ½ x 16-in. steel plates on a new shearing machine. Front conveyors include a storage area and a centering unit, in addition to a lower feed table and overhead feeding arms. Steel plates, up to a maximum size of ½-in. thick x 8-ft wide x 16-ft long, are delivered to the feed area by an overhead crane. As this material feeds through the shear, blank widths are accurately measured with a power-operated back gage. Sheared pieces discharge at the machine's rear by means of a rear conveyor and a separator. (Cincinnati Shaper Co.)

For more data circle No. 43 on postcard, p. 115



A 15-POUND LIGHTWEIGHT WITH A 2-TON PUNCH!

Introducing the new Black & Decker No. 8 H.D. Nibbler

Take big bites out of your heavy work, bring the tool to the job and slash cutting costs . . . with the all-new portable Black & Decker No. 8 Heavy-Duty Nibbler. Its 2-ton punching wallop cuts smoothly through 8-gauge plate, goes through heavy-gauge tubing and corrugated (most stainless, too) like a knife through butter . . . replaces torch cutting, eliminates edge grinding.

This new No. 8 Nibbler has more power with the greatest-ever load capacity . . . a unique built-in cutting-oil system, carbide dies for longest life. And its 15-pound weight, compactness and easy-grip T-handle assure perfect cutting control at all times.

There's a new and improved Black & Decker No. 16 Nibbler, too, for up to 16-gauge metals. See both new Nibblers now. They're sold by leading distributors everywhere. *For sales or service, look in the Yellow Pages of your telephone book under* TOOLS ELECTRIC

Black & Decker®

CUTS MAN-HOURS TO MINUTES

NEW No. 16 NIBBLER speeds through corrugated, straight or circle cuts with the greatest of ease. Won't bend or curl metal. Reversible punch for double life.

No. 16 SHEAR cuts easily through metal sheet . . . follows pattern lines perfectly. B&D also has No. 12 Shear for heavier metal, No. 18 for lighter work.

THE BLACK & DECKER MFG. CO., Dept. 0909
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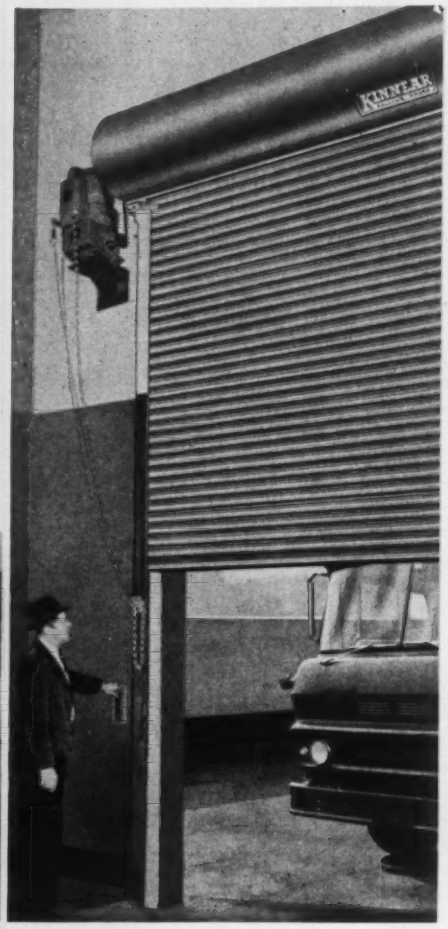
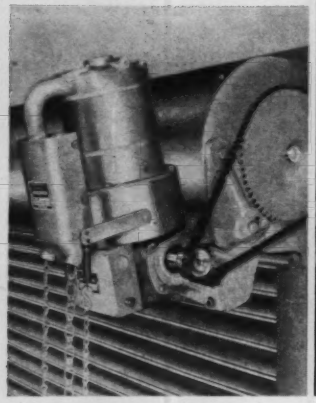
There's a "Powerful Difference" in KINNEAR Motor Operated Rolling Doors!





The Kinnear Motor Operator is NEW in every detail -- AND BUILT EXCLUSIVELY FOR DOOR SERVICE

Kinnear's new Power Operator for rolling doors is a specific-purpose unit. All features are uniquely integrated for door control that combines highest efficiency and durability.

Its *reserve power* assures smooth action that defies wind pressure, drifted snow, collected grime, or extra years of usage.

Special thermal protection prevents overload troubles — the motor cuts out before damage can occur.

New worm gearing takes "stop and go" action in its stride!

A new centrifugal clutch transmits motor action to the door without shock, increasing protection against motor stalls and overload damage.

The new power unit permits easy removal for servicing without disturbing the auxiliary hand-chain operator.

Seven sizes fit all door needs without costly "over-powering." Can be installed vertically or horizontally . . . bracket-mounted on the door or wall, or for through-the-wall operation.

Kinnear originated the door with the curtain of interlocking slats that opens upward, coils compactly overhead, and saves floor, wall and ceiling space. This new Power Operator brings the basic efficiency of Kinnear Doors to a new high in dependable, push-button convenience. *Write for complete information on Kinnear Rolling Doors and Power Operators.*

The KINNEAR Manufacturing Company

KINNEAR® ROLLING DOORS
Saving Ways in Doorways

FACTORIES:
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1742 Yosemite Ave., San Francisco 24, Calif.
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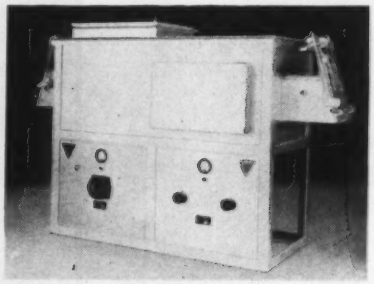
NEW EQUIPMENT

Dual-Zone Furnace

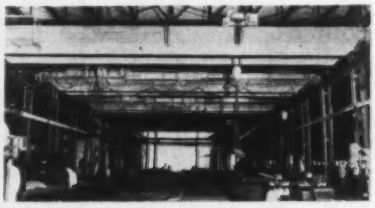
Here's an unusual design for electric furnace heat treating. A new furnace operates simultaneously at 2900°F, and at 2300°F, in two adjacent hot zones. By manual means, the work is moved directly into the high-temperature zone. After processing at this temperature, it moves into the low-temperature zone. Following suitable exposure at this lower quenching temperature (2300°F), the work's removed from the furnace and sent to a quench or bath. Molydiscilicide heating elements maintain the heat in the high-temperature zone. Silicone-carbide elements do the job in the low-heat zone. Each chamber has its own individual tap transformer and direct-reading, power-input ammeter. (Pereny Equipment Co., Inc.)



For more data circle No. 44 on postcard, p. 115

Industrial Cranes

Compact design gives a new line of industrial cranes good hook approach and plenty of floor coverage. The full line includes 5-, 7½-, 10-, 15-, and 20-ton models. Lifts ranging up to 110 ft are available on the 5- and 7½-ton cranes. The 10-ton model has a maximum lift of 118 ft; the 15-ton crane a maximum lift of 52.8 ft; and the 20-ton model a 55.6-ft maximum lift. Spans of 20-120 ft are available on all five models. All feature stand-

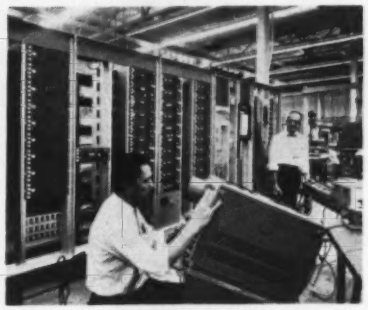


ard mechanical, structural and electrical components. Since these key items are interchangeable, upkeep and spare-part inventories are held to a minimum.

For more data circle No. 45 on postcard, p. 115

Controls Production

A new production-control system monitors factory operations and collects essential data. Comprising the equipment are status monitors installed in groups of 20, operator control stations, paging selectors and alarm stations. Status monitors display work progress at various machines on the factory

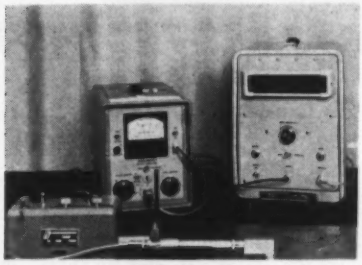


floor. Paging selectors signal between the control center and the machines or work stations. Machine operators use control stations to notify the production controller of machine breakdowns or other abnormal conditions. (General Electric Co.)

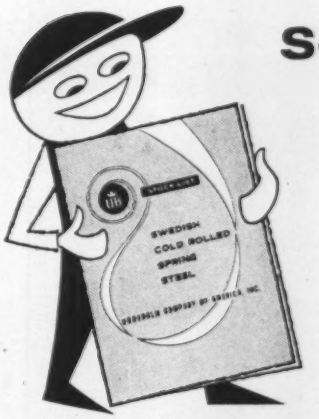
For more data circle No. 46 on postcard, p. 115

Checks Surface Flaws

High-production checking of surface irregularities is possible with a new profile meter. This single combination of equipment measures both peak count and average-roughness height. By controlling the number of peaks above a preset level, and the average roughness height



on a machined or ground surface, it's possible to control the appear-



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UDDEHOLM

Spring Steel Catalog-Stocklist

This 44-page booklet provides full information on all grades and sizes of fine UDDEHOLM SWEDISH Specialty Spring Steels. They are produced in our Swedish Mills, from high-purity iron ores. The excellent flatness, uniformity and close thickness tolerances of UDDEHOLM Spring Steels will give you a better product at less cost.

BLUE TEMPERED • ANNEALED
Spring Steels

. . . . in different grades, tempers and finishes are some of the types stocked in our modern warehouses. Sizes range from .001" to .125" thick, ⅛" to 16¼" wide. Slitting and edging facilities are also available.

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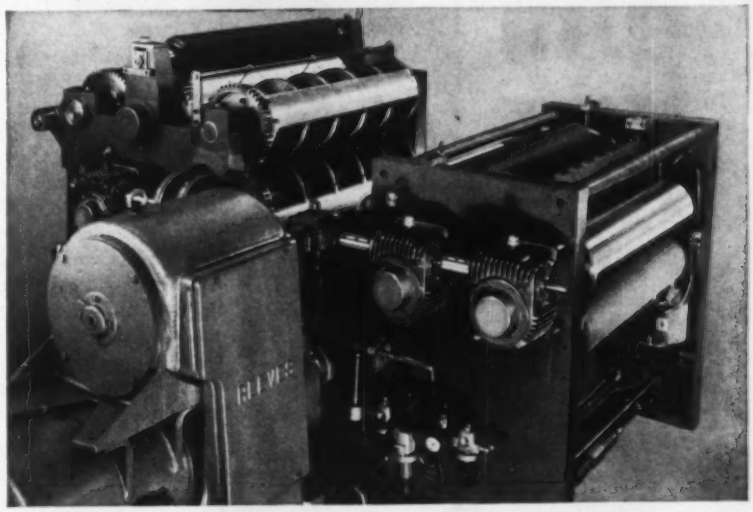

Paster Pampers Printing Presses

Splicing a new roll onto an expiring ribbon of paper while it's moving 300-ft. per minute requires precise timing and accurate synchronization. This automatic butt splicer uses three Cone-Drive **double-enveloping worm** gear hollow shaft speed reducers to transmit the vitally important synchronized drive speed instantaneously and smoothly. The fact that these are standard, not special, reducers testifies to the high degree of accuracy built into every Cone-Drive unit.

Accurate Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

CONE-DRIVE GEARS

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$8.00 MORE PER TON FROM TURNINGS

American Rolling Ring Metal Turnings Crushers quickly pay for themselves. Savings of approximately $4.00 per ton through extra cutting-oil recovery from crushed turnings often pay for the crusher in a short time. In addition, uniform chips command a higher price (up to $4 more per ton). Add to this the valuable savings in storage space (up to 75% less), the easier handling, the heavier car loadings possible, and you have tremendous profit advantages with the American Crusher working in your plant.

If your turnings amount to 20 tons or more a month, there's an American Crusher designed to pay off big for you.

American has manufactured Turnings Crushers since 1917 and makes a wide range of models with capacities from 1 ton to 50 tph.

Write for Bulletin # 159.

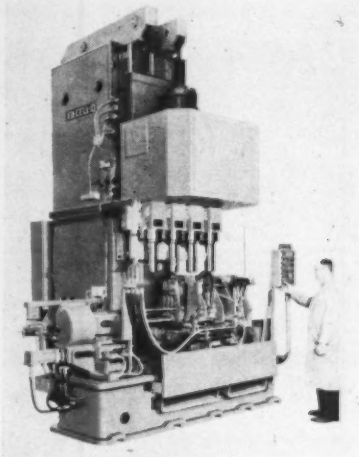
American PULVERIZER COMPANY
ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS
1439 MACKLIND AVE. ST. LOUIS 10, MISSOURI
6103

ance of the finished product. In many products, luster and sheen is the controlling factor with the buying public. Automotive bumpers are a good example. (Micrometrical Mfg. Co.)

For more data circle No. 47 on postcard, p. 115

Faces Crankshafts

A vertical cylinder-boring machine also finish-faces crankshaft thrust surfaces. There's a big time saving here, since facing operations are performed at the same time as finish-boring of the cylinder bores. In operation, an engine block is manually loaded from a conveyor at



the right side of the vertical borer. Then the block is pushed against positive stops. As the elevator lowers, locating pins enter the part and clamp it in place. Machining follows, during which a metered air blast clears chips from tools and machined surfaces. An air blast also blows chips away from rest pads prior to loading. Should a chip become lodged between rest pads and the work, a pressure switch renders the machine inoperative. (Ex-Cell-O Corp.)

For more data circle No. 48 on postcard, p. 115

Coil-Peeler Roll

Threading heavy-gage steel strip through a slitting line becomes an easy task with this new mechanized unit on the job. Termed a four-roll

In snow or mire, they reach the fire

FWD Fire Engines feature power and traction on all four wheels to assure maximum fire-fighting reliability . . . they go where the fire is.

VR-65 TRIPLES TOOL LIFE ON FWD FRONT AXLE BALL ASSEMBLIES

- *Increases tool life 300%*
- *Speeds cutting 200%*
- *Eliminates lapping and polishing*

Cutting the spherical radius of FWD's front axle ball assemblies imposed four difficult machining conditions — (1) a drop from 900 to 450 SFM, (2) two interrupted cuts, (3) a 63 micro-inch, or better, finish requirement and (4) a Brinnell hardness of 230-270. The superior edge strength of VR-65 has more than met these tough conditions. This is why FWD Corporation, Clintonville, Wisconsin chose V-R. It is why more and more plants are making V-R their first choice. To learn how V-R's complete line of cutting tools can help you, call your V-R man today.

VASCOLOY-RAMET CORPORATION,
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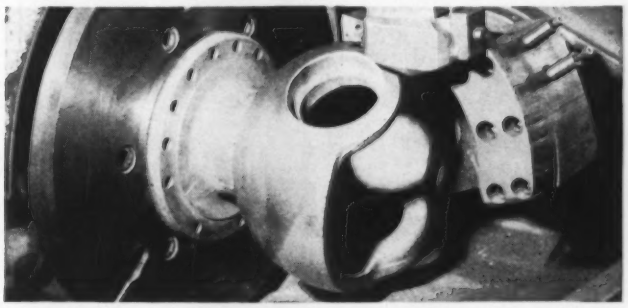

V-R

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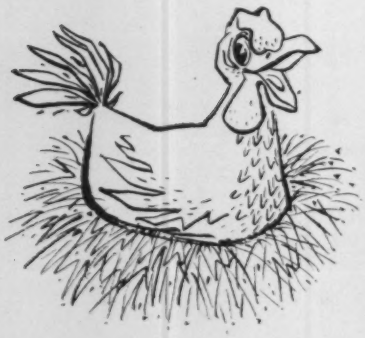

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to
AUTOMATE
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When existing equipment is not available to give you optimum efficiency in automated production lines — or when products or profits depend on special machinery to do a special job — you can be sure of a solution of your problem if you Take It To Taft-Peirce.

Taft-Peirce designers, engineers, and production experts are men of long experience in creation of specialized machinery. They are equipped to take your problem and carry it through to any step from concept to installation.

This Taft-Peirce capability has been shown in development of production equipment for widely varied industries, and its people are specialists in development of automatic machinery, gaging and controls.

Send for Bulletin

Describes Taft-Peirce contract service in detail. For action now, call or write Mr. Ford at Taft-Peirce in Woonsocket, Rhode Island.

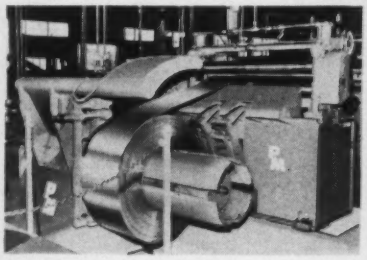
TP 6-58

TAKE IT TO
TAFT-PEIRCE

29 Mechanic Ave., Woonsocket, R. I.

NEW EQUIPMENT

flattener and coil peeler, it's actually a combination peeler, flattener and holddown roll. In operation, the leading end of the strip is liter-

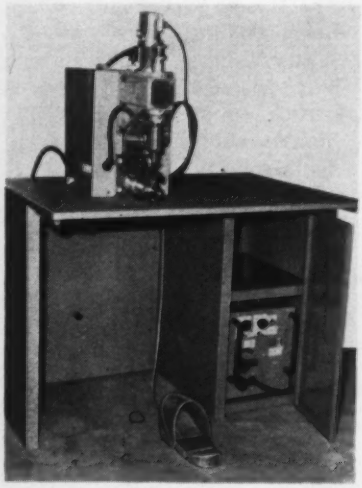


ally pried from the coil. Coil set is taken out of the material as it is driven through flattening rolls prior to entering the slitter. Thus, control of strip travel becomes almost a pushbutton operation. This machine contributes greatly to the productive efficiency of slitting lines. (Production Machinery Corp.)

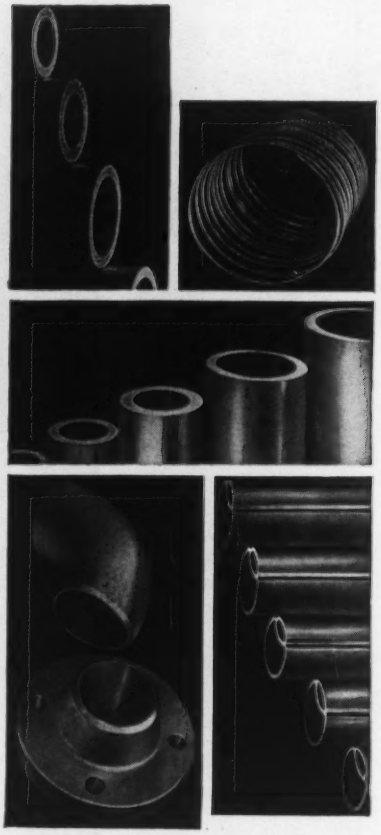
For more data circle No. 49 on postcard, p. 115

Press-Type Welder

Here's a new bench-model welder with the power and precision to handle both rough and delicate work. Its large variety of tip setups means you can handle a wide range of ferrous and non-ferrous metals. Several special features account for this performance. For example, fin-



ger-tip adjustments alter welding pressure from 6-330 lb. A vernier regulator facilitates 162 different current settings from 900 - 1600 amp. There's also fast follow up



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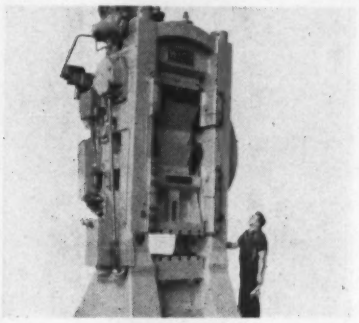
ST. LOUIS • TULSA • N. KANSAS CITY

through an air- and spring-pressure combination. Complete water cooling rounds out the picture. (The Powerad Co., Inc.)

For more data circle No. 50 on postcard, p. 115

Knuckle-Joint Presses

These 100-250 ton presses are used for a wide range of work. Coining, extruding, cold forming,

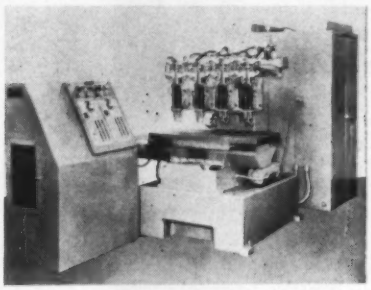


sizing, swaging and heading are only a few of the many applications. Manual- or automatic-feeding devices are available for fast material handling that boosts production. In addition, the presses have a special pneumatic-friction clutch and brake unit. Die-area lighting is another bonus feature. (Federal Warco Div., The McKay Machine Co.)

For more data circle No. 51 on postcard, p. 115

Drills Circuit Boards

Here's a new machine designed to drill printed-circuit boards from a wide variety of materials and thicknesses—and do it at low cost. It's a numerically-controlled, tape-



programmed unit consisting of a point-positioning table and four drilling clusters, each with four, independent, air-feed drills. In effect, the clusters act as four coordinated drilling units. This eliminates the cost of individual control systems,

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FAIRFIELD

GEAR PERFORMANCE to match the speed, size, and power of modern machines is a Fairfield specialty. This is possible because Fairfield is a leader in utilizing the most advanced methods, machines, and techniques for producing better gears. By keeping apace with modern engineering progress, Fairfield renders an invaluable service to many of the nation's leading machinery builders: *"Gear Performance Made to Order!"*

If you use gears in the product you make, we believe it will pay you, as it has others, to become acquainted with FAIRFIELD – the place where fine gears are produced to meet your specifications EFFICIENTLY, ECONOMICALLY! Check with Fairfield NOW on your gear requirements. *Call or write.*

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Gears and Differentials for FINE GEARS Made to Order for:
TRACTORS • HEAVY DUTY TRUCKS • AGRICULTURAL MACHINERY • POWER SHOVELS AND CRANES
MINING MACHINES • ROAD GRADERS • BUSES • STREET SWEEPERS • INDUSTRIAL LIFT TRUCKS

bases, and power plants for each unit. Under average conditions, the driller operate at 50 cycles per minute. It drills four boards at once, for a total of 200 holes per minute. If four boards are stacked, 16 holes can be drilled at once. Of course there's a proportionate increase in production. (Edlund Machinery Co.)

For more data circle No. 52 on postcard, p. 115

Powerful Seven

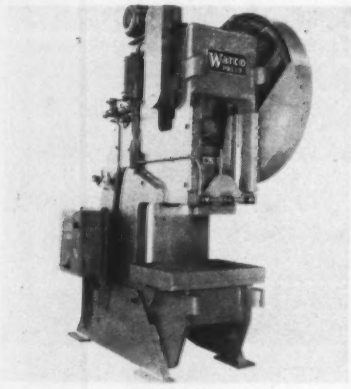
Seven new lift trucks feature a new engine, new mast, forks, carriage and power steering as standard equipment. A six-cylinder gasoline engine, which develops 77 hp, is standard power for the newcomers. However, LP-gas and diesel engines are also available. Masts are made of high-carbon steel sections, welded together to provide a rigid unit structure. Piston-type lift cylinders with self-adjusting inner seals, and friction-reducing load rollers provide easier lifting and extend mast life. Forks are heat-

treated alloy steel. They have a long taper and rounded ends that make it easy to get under the load. (Allis-Chalmers Mfg. Co.)

For more data circle No. 53 on postcard, p. 115

Open-Back Presses

New, open-back presses are available in single-geared or flywheel-type models. However, they can be built with double-back gearing if desired. Geared capacities range from 40-200 tons. The flywheel types are sized from 40-75 tons. One interesting feature is the gap-type frame. It's arranged so that the press may be inclined. This frame provides unobstructed access to the die area from three sides of the press. Fin-



ished parts may be removed from the dies and directed through an opening in back of the press to a receptacle. (Federal Warco Div., The McKay Machine Co.)

For more data circle No. 54 on postcard, p. 115

RA 330® brings the space age **CLOSER**

RA 330 supports rocket cases in pit furnace 10 ft. diameter by 30 ft. deep.

RA 330 provides strength at 1900° F. to support, without fear of dropping, a 3500 pound load; resistance to thermal shock of rapid heating and air quenching; resistance to furnace atmosphere and oxidation.

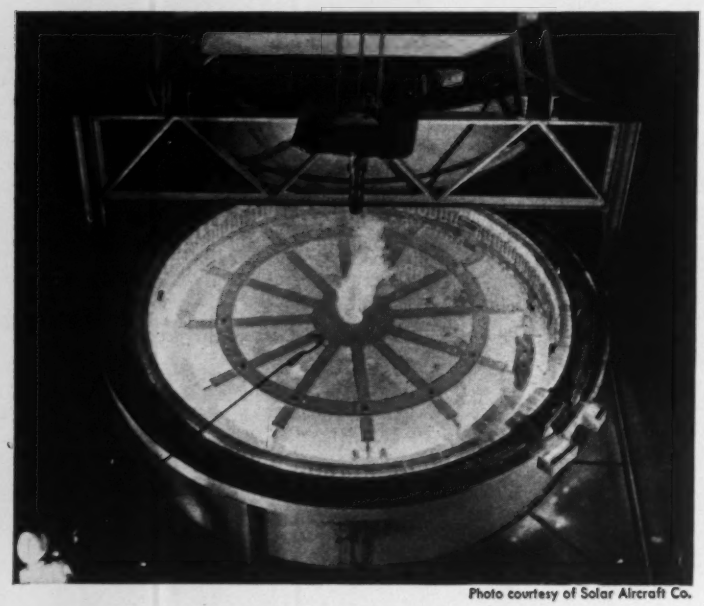


Photo courtesy of Solar Aircraft Co.

Based upon highly successful use of RA 330 in other applications with temperatures ranging up to 2250° F., Solar Aircraft Company selected RA 330 for this critical application.

For best performance specify RA 330 for your heat treating fixtures and furnace parts.

Rolled Alloys Heat Resisting Alloy Specialists will gladly be of service. For technical data—send for Bulletin No. 107.

ROLLED ALLOYS, INC.
Heat and Corrosion Resistant Alloy Specialists
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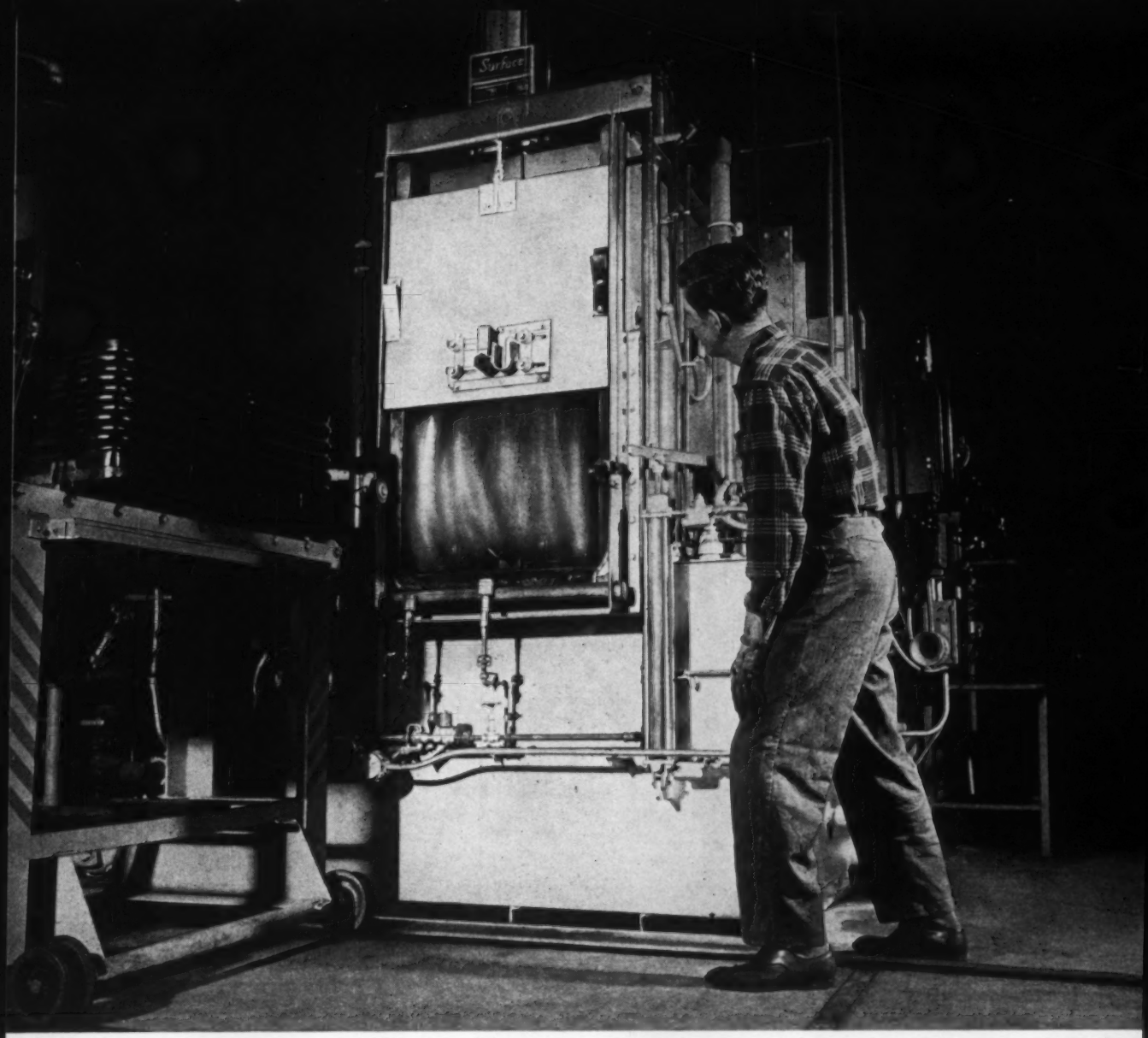


Fifty different job lots are heat treated in 24 hours in this one Allcase® furnace.

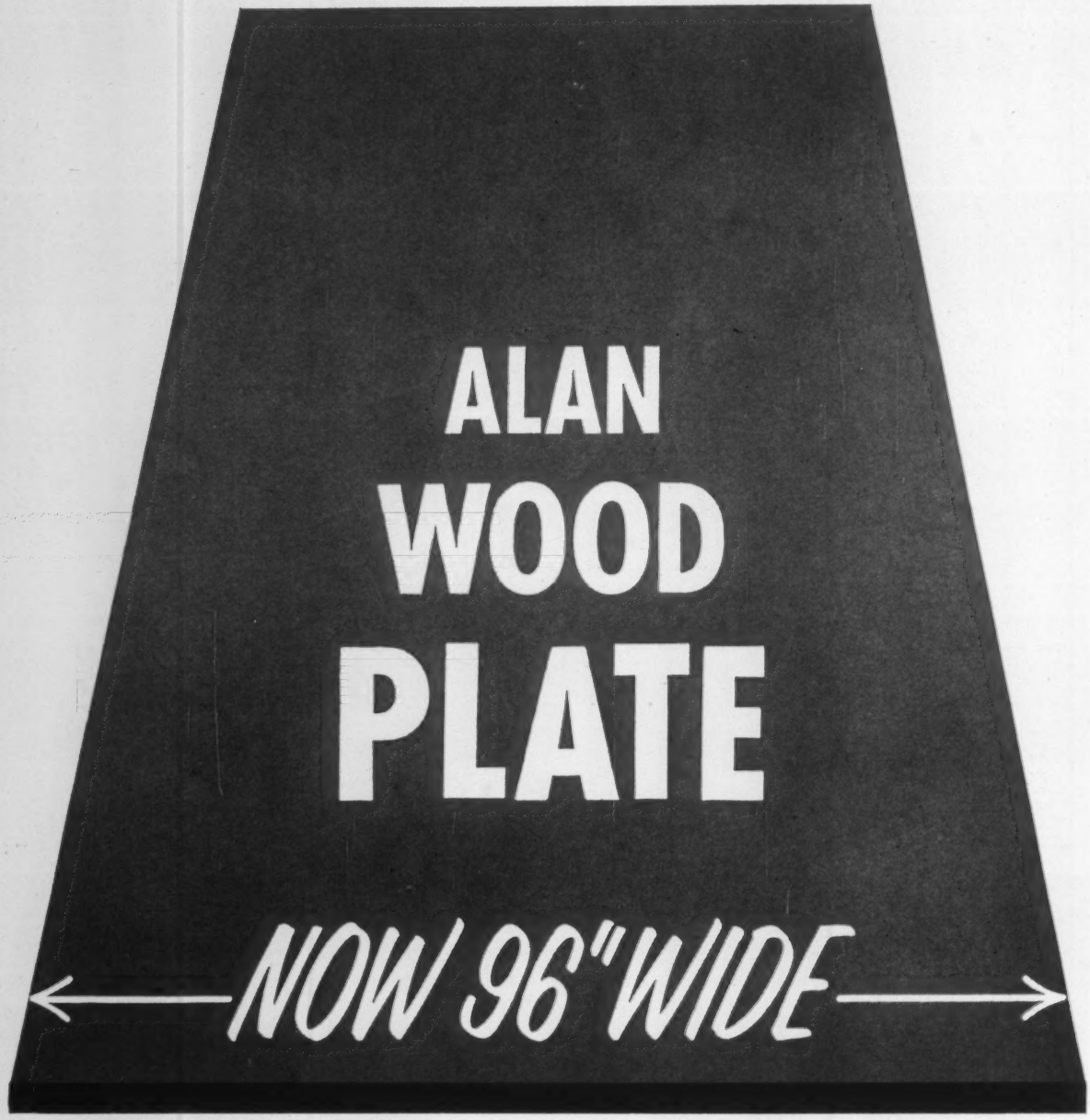
The Ohio Metallurgical Service of Elyria, Ohio, is finding the Surface Allcase Furnace the solution to maintaining high quality, competitive prices, and fast delivery. A large variety of small job lots, such as small machine components, forgings, and automotive parts, are treated in a carbon controlled atmosphere, which adjusts automatically.

Critical temperature control has eliminated warpage of even the smallest springs. Unique Surface Power Convection permits uniform heating of high density loads and uniform atmosphere contact for all parts, eliminating rejections. Gas consumption has been reduced 30 percent.

Write for information: 2373 Dorr St., Toledo 1, Ohio. In Canada: 2490 Bloor St., West, Toronto.

SURFACE

SURFACE COMBUSTION, Toledo 1, Ohio/ a division of Midland-Ross Corporation MR



Now—from our new wide plate mill-quality sheared plate up to 96 inches wide . . . or up to 4 inches thick . . . in lengths up to 80 feet.

A unique third stand adds improved finish and flatness to regular plate. It is also used to impress the familiar and exclusive Super Diamond pattern on floor plate, now available up to 2 inches thick.

We've added a new blooming mill, too . . . for handling bigger ingots, turning them into the heftier slabs needed to feed our plate mill's extra capacity.

These new mills are part of Alan Wood's $36-million expansion program . . . creating new and better ways to serve you. Let us supply your steel needs.

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Plates (Carbon, Alloy, Hi-Strength) • Cold Rolled Sheet and Strip • Hot Rolled Sheet and Strip (Carbon, Alloy, Hi-Strength) • "A. W." Super Diamond Patterned Floor Plate • "A. W." Algrip Abrasive Rolled Steel Floor Plate • "A. W." Iron Powder • "A. W." Pig Iron • Foundry and Industrial Coke • Coal Chemicals Mine Products • "Penco" Lockers, Cabinets and Shelving.

Market Continues to Strengthen

Recovery of the steel market is virtually complete. Orders continue to improve at a stronger rate.

Market strength is evident even without strong auto orders or any buildup of consumer inventories.

■ The steel market has recovered. For several weeks, new orders have been gaining across a broad base of products and at an accelerating rate.

The improvement will make September the best month of the year to date and assures further improvement for the fourth quarter.

Inventory to Come—The firming of the market has been accomplished without any great surge of automotive steel buying and without any inventory buildup. When the auto industry's labor troubles are over, and when major steel users move to rebuild steel stocks, the market will strengthen even more.

Encouraging to the steel industry is the broad range of products that are showing strength and also the wide range of consumers who are buying steel at a greater rate.

100 Million Tons—The industry should now produce 100 million tons of ingots this year with relative ease. Furthermore, the industry should be producing steel at a rate of better than 80 pct of capacity in the fourth quarter. Some individual companies will exceed that rate by a good margin.

Surprising strength is noted in heavy plates and structurals. Manufacturers' wire, sometimes considered a barometer of overall industrial strength, is one of the surprises of the recent upsurge of new orders.

Who's Ordering—Steels tied with construction are moving up well. Appliance builders are ordering more steel for the fall upturn in production. Farm equipment, which had been expected to tailspin because of the drought and other factors, including crop restrictions, has shown no worse than expected seasonal declines.

Steel warehouses expect a 10 pct gain in September over August, which, in turn, showed an upturn of 5 pct over July for the service centers. Service centers are blowing hot and cold in inventories, but some buildup is likely in view of the improved sales and forecasts.

Chew-Up Rate — It's estimated that steel is now being consumed almost 30 pct faster than at the low point this year. The rate of consumption, alone, accounts for the improved rate of sales. This means that there is virtually no inventory buildup in evidence and steel stocks, nationally, still hover around 12 million tons. This is considered too low a level to sustain an improved rate of business comfortably.

This means that even though steel users are determined to operate with low levels of inventory, and are still convinced they can expect relatively fast delivery, some buildup has to result.

Furthermore, delivery promises are lengthening out slowly and consumers will not be able to count on the fast shipments that were characteristic of this year.

In fact, many are likely to get caught short as the market tightens later on.

District Steel Production Indexes 1957-59=100

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	N.A.	116	107	56
Buffalo	N.A.	93	77	59
Pittsburgh	N.A.	97	90	44
Youngstown	N.A.	96	84	42
Cleveland	N.A.	119	102	52
Detroit	N.A.	134	102	72
Chicago	N.A.	109	102	60
Cincinnati	N.A.	114	109	55
St. Louis	N.A.	125	115	72
Southern	N.A.	111	108	47
Western	N.A.	117	120	56
U. S. Index	N.A.	108.4	99.3	52.7

Source: American Iron & Steel Institute

Steel Production, Composite Prices

Production	Last Week	Two Weeks Ago	To Date 1961	To Date 1960
(Net tons, 000 Omitted)	N.A.	2,020	62,050*	60,130
Ingot Index				
(1957-59=100)	N.A.	108.4	93.3	125.8
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel base (Cents per lb)	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.44	$66.44	$66.44	$66.41
Scrap No. 1 hvy (Gross ton)	$39.17	$38.50	$37.83	$32.50
No. 2 bundles	$25.83	$24.50	$24.50	$22.50

Gear Prices Could Climb Soon

Upcoming defense contracts may breathe new life into the mechanical drive industry—especially for gears.

From all indications, September is a good month to place orders. Prices could rise soon.

■ The mechanical drive field is beginning to stir. And much of the activity centers around what appears to be the beginning of a rebound in gear business.

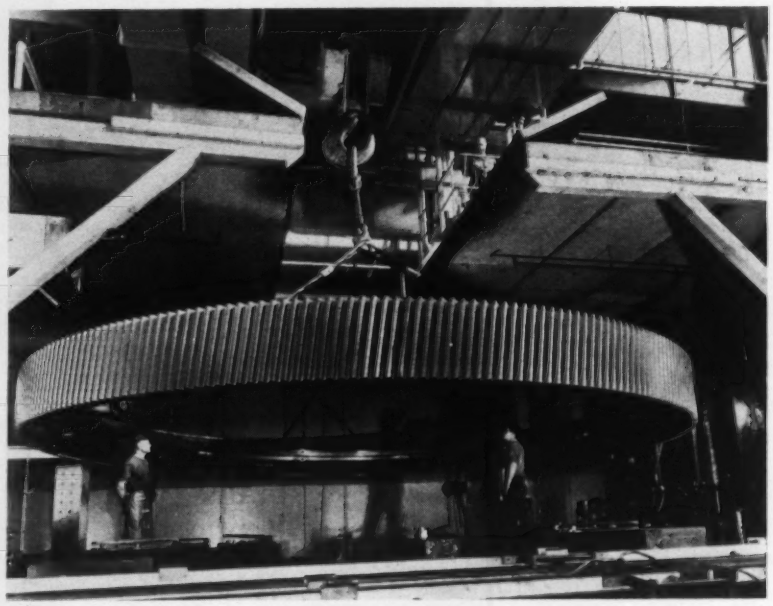
Without a doubt, upcoming defense contracts will mean some gains for mechanical drive makers. It will probably begin with small, precision gears. But it will certainly affect heavier gearing and hydraulic power transmission as the Administration boosts spending for conventional weapons.

Hints that this trend is already underway are now appearing. Producers of heavy machinery started releasing some heavy equipment orders in late July and early August. These orders have been quoted but inactive for as long as 12 months. And among these heavy orders were at least several that relate directly to the defense effort.

Watch Market — To the drive buyer, this means September will be the month to watch the market carefully. Most prices are presently soft; deliveries are current.

Gear manufacturers report that shops are operating as high as 75 pct of useful capacity. But they admit that the majority of the shops in many gear-producing areas are still operating at around 50 pct of capacity.

In October, two factors will begin to affect the gear market. First, rising foundry costs and climbing labor costs will definitely firm gear prices—if not boost them.



MARKET FIRMING: There are indications that the gear market is becoming stronger as defense contracts offer new life. Here, a 23-ft diameter gear is worked on at Milwaukee's Falk Corp.

Extended Deliveries—Second, if industry forecasts are correct, mechanical drive business will be up soon. Deliveries will probably begin to stretch out. Of course, most buyers agree that there is very little sign of this happening at the moment.

Nevertheless, an industrial upswing backed by a fast start on an increased defense program would certainly result in a lengthening of delivery times. Most defense work would probably be of the old-fashioned tank-and-truck variety.

Missing Workers — One little-mentioned but very vital factor: After several difficult years, especially for gears, the industry has lost some skilled workers. And they can't be replaced quickly.

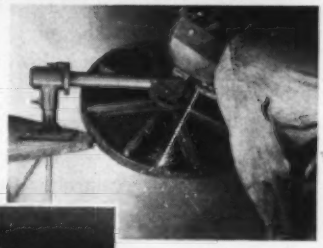
There are even some drive producers who question any real upturn in gear orders. But the fact is that as early as mid-July, a handful of gear and fluid power producers were beginning to get new business. This has been spreading at a mildly advancing rate ever since.

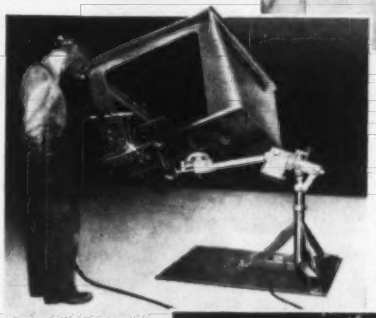
The conclusions reached by some buyers: From the standpoint of price, September is an excellent time to buy gears. This also seems to be true of belting, chain, roller chain, and hydraulic equipment. The chance of additional price cuts are almost nil. An increase isn't likely, but it's certainly possible.

Also, the likelihood of extended deliveries prior to November is very limited. But defense orders can always create unexpected delivery problems.

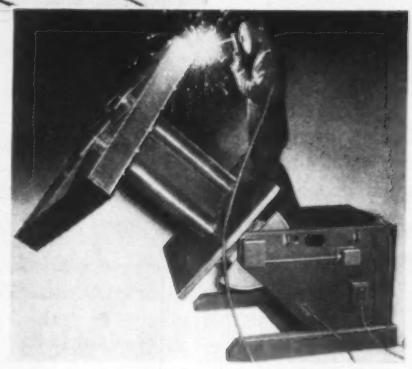
PROFITS are built on DEPENDABILITY

360° Table tilt allows welding on both sides of workpiece without re-clamping when you use this Aronson Bench Turntable.





Heavy bulky pieces become childs-play when balanced on an Aronson Universal Balance positioner.



Heavy Duty Gear Driven Positioner showing weldor making good use of Aronson Flat Top Design.

"Positioned" welding is much faster while the quality and appearance of the welds is superior to that of manually positioned workpieces. But to realize its profitable advantages, the positioner must give dependable service over the long haul. Aronson Positioners and Turning Rolls lead all others in long life, ruggedness, precision and dependability.

Your profits are built on dependability and dependability is our middle name.

ARONSON BUILDS THE MOST COMPLETE LINE OF POSITIONERS ...WITH CAPACITIES RANGING FROM 25 POUNDS TO 600 TONS

Universal Balance® Positioners • Bench Turntable Positioners
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Geared Elevation Positioners • Magnetic Welding Clamps

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ARCADE, NEW YORK

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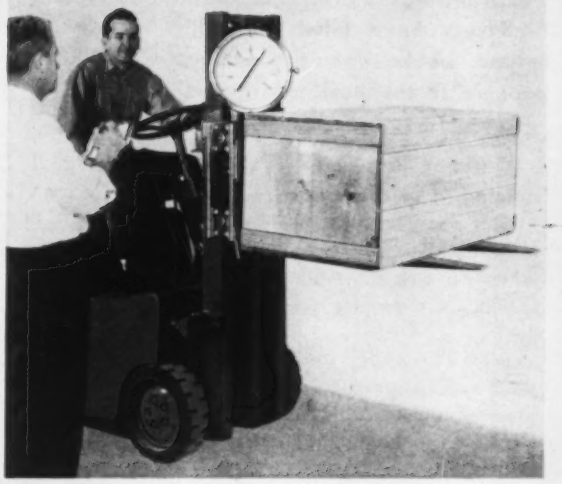

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SELF CONTAINED this scale unit is a complete weighing system as received in your plant.

No connection to your lift truck hydraulic system. Can be used with gasoline, propane or battery powered trucks.

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- All Lift Truck Hydroscales are designed with overall dimensions to be within your truck width.
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- **GUARANTEED**—Under normal use the scale is guaranteed against defects in material, workmanship and accuracy for a period of 1 year from date of shipment from our plant.

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"World's Largest Manufacturer of Hydraulic Scales"

Write for Catalog No. 161

HYDROWAY SCALES, INC.

31290 Stephenson Highway • Royal Oak, Michigan

September Bookings Reflect Strength

Buyers have filled out mill order books for September, making it the best month this year for many producers.

October bookings are also coming in at a good pace.

■ Mill bookings for September have taken on weight. And orders for October are coming in at a good pace.

While inventory building is not yet a general practice, more buyers are looking ahead. Increased use of steel is also helping to fatten mill bookings.

Most products are included in the ordering upsurge. Among them are sheet and strip, plate, bar, shapes, wire and tinplate. Two exceptions to the trend are some grades of pipe and stainless products.

Plate Active — For plates and shapes, order entries in September are at the peak of the year for many mills. Plate bookings in the Cleveland area, for example, are running about 30 pct ahead of August. On the East Coast, plate users are stepping up the tonnage on their orders.

Stronger ordering for bar products is also bolstering order books. Cold-finishers at Chicago are increasing their inventories of hot-rolled bar stock. Users of cold-finished bar in the Cleveland area are also boosting supplies. Increased business, stockbuilding by warehouses, and the need for fast deliveries are given as the reasons.

Bookings for manufacturers' wire are also improving. As yet, this hasn't shown up in longer lead times, but this is a growing possibility.

Sheet and Strip—Even in the face of the uncertain automotive outlook, September and October mill bookings show progressive gains. Improvement is based on better demand from many types of users. Galvanized continues strong with deliveries out eight weeks or more. Mills are operating at capacity with no signs of a letup in demand.

Bar—September is shaping up as a better month than August for many mills. Unless there's a prolonged auto shutdown, bar mills expect a strong fourth quarter. Some mills in the **Cleveland** area are booked through September and into mid-October. Auto forging suppliers have stocked up on supplies and now other users are coming into the market.

At **Chicago,** mill operations continue at good levels. Cold-finishers are counting on a fairly strong fourth quarter—15 to 20 pct over the third.

Plates and Shapes—Both delivery times and size of orders are increasing at **East Coast** plate mills. Major buying influences are shipyards and tank fabricators. Structural deliveries are still 2-4 weeks, but demand is good.

At **Pittsburgh,** improved business has brought some tightening in plate deliveries. Heavy plates are out a week or two.

However, the market is not as strong at **Chicago** where deliveries are still averaging two to three weeks. Mills are running about 15 turns a week. But producers are encouraged by reports of record new building contracts and increased spending for construction.

Tinplate—Both new orders and mill shipments for September are holding up well. Good weather is credited with extending the shipping season. August shipping releases at one **Pittsburgh** tinplate mill were better than expected.

Wire Products—Orders for manufacturers' wire are moving up. Construction products are holding up at seasonally high levels. Wire mills say demand continues to exceed sales forecasts. Some producers are losing orders because they are unable to meet delivery demands. A sizable upsurge in auto wire orders would really put this market on fire.

Pipe and Tubing — Orders for standard pipe and oil country seamless are improving. For some mills, August may be the best month of the year for these products. However, customers are still ordering from day-to-day. There was a brief flurry of advance orders a few weeks ago when reports of materials controls were circulated. This has now died down again.

Service Centers—Sheet is still the heavy item in sales, especially in the **Midwest.** However, business is lagging on both the **East Coast** and the **West Coast.**

Warehouses, however, expect the overall sales gain in September will be 10 pct above August. Sales in August, in turn, were about 5 pct over July.

Warehouses are blowing hot and cold on inventories. Particularly in large chains, the home offices want to keep inventories down; the local manager frequently thinks he needs to build up stocks.

After the unexpected strength of summer sales, many are watching inventories more closely. But an extension of mill lead time would have the effect of pulling warehouse inventories down in a hurry. Warehouses may be doing some active buying this month.

PURCHASING AGENT'S CHECKLIST

Impact of increased defense spending starts to hit industry. It's a forerunner of long-range build-up. P. 67

Coextrusion has great potential as fabricating tool. P. 99

COMPARISON OF PRICES

(Effective Sept. 1, 1961)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Sept. 1 1961	Aug. 28 1961	Aug. 7 1961	Sept. 6 1960
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	14.10
Stainl's C-R strip (No. 302)	49.50	49.50	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plates (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	46.75
Wrought iron bars	14.90	14.90	14.90	14.90
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 10 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.49¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Sept. 1 1961	Aug. 28 1961	Aug. 7 1961	Sept. 6 1960
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.68	$70.68	$70.68	$70.57
Foundry, South Cin'ti.	71.92	71.92	71.92	72.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.11	70.11	70.11	70.07
Basic Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese 74-76 pct Mn. cents per lb‡	11.00	11.00	11.00	11.00
Pig Iron Composite: (per gross ton)				
Pig iron	$66.44	$66.44	$66.44	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$37.50*	$36.50	$35.50	$31.50
No. 1 steel, Phila. area	40.50*	39.50	39.50	34.50
No. 1 steel, Chicago	39.50	39.50	38.50	31.50
No. 1 bundles, Detroit	35.50	35.50	35.50	28.50
Low phos., Youngstown	42.50*	41.50	40.50	35.50
No. 1 mach'y cast. Pittsburgh	45.50	45.50	45.50	47.50
No. 1 mach'y cast. Phila.	49.50	49.50	49.50	49.50
No. 1 Mach'y cast. Chicago	49.50	49.50	48.50	47.00
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$39.17*	$38.50	$37.83	$32.50
No. 2 bundles	25.83*	25.17	24.50	22.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.75-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	$31.00	$31.00	$31.00	$33.00
Copper, Lake, Conn.	31.00	31.00	31.00	33.00
Tin, Straits, N. Y.	124.25†	123.75**	116.50	102.75
Zinc, East St. Louis	11.50	11.50	11.50	13.00
Lead, St. Louis	11.00	11.00	11.00	11.80
Aluminum, ingot	26.00	26.00	26.00	26.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Larado, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strip.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

THE 5100 HOUSE

PETERSON STEELS, INC.

Union, N. J. • Wethersfield, Conn.
Detroit, Mich. • Melrose Park, Ill.

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INDUCTION CONSUMABLE LEADED

PETERSON STEELS, INC.

Union, N. J. • Wethersfield, Conn.
Detroit, Mich. • Melrose Park, Ill.

Prices Climb Another Notch

The market reflects additional strength as prices in most key areas are up again this week.

Pittsburgh's advances confirmed earlier predictions.

■ The scrap market added even new strength this week as prices climbed in almost every key area.

The Pittsburgh market moved up decisively on the basis of industrial and mill sales. Local mills in Philadelphia also came into the market at prices generally up $1. And small spot purchases inched the Chicago market up another notch.

Last week there was talk of weakness in the Detroit market. But export buying and September industrial list activity has given added strength to that area too.

One of the few areas without additional price gains this week is Cincinnati. But demand is good there and the market appears firm.

The IRON AGE composite price for No. 1 heavy melting jumped to $39.17 this week. The composite price for No. 2 bundles is up to $25.83.

Pittsburgh — The market has moved up decisively with industrial and mill sales confirming the strength that had been indicated earlier. Local factory bundles were split among several buyers at prices ranging from $46.50 down to less than $45. The high was about $1 over last month's high. Later in the week, a mill on the fringe of the district came in with a price of $38 to the dealer for No. 1 heavy melting. This was $1 above the latest appraisal. Prices of $25 and $26 are being offered for No. 2 bundles with few takers at the lower figure.

Chicago—Small spot purchases by several mills continued to set the market pace. Though tonnage was small, dealer prices are very strong. And brokers appear reluctant to cover new orders at existing levels. New factory bundle lists advanced slightly. Threat of an auto strike, resulting in a dryup of auto scrap, keeps pricing firm. Japanese buyers are again making inquiries at Lake Michigan ports. There are hints of some long-term contracts.

Philadelphia—New purchases by local mills brought new strength to this market. The prices of most No. 1 dealer grades are up $1. This follows gains recorded in Chicago and Pittsburgh last week. Most area dealers agree that domestic business is picking up. But they admit it's nothing to write home about yet. Export activity is still very much alive.

New York—Prices and the general level of activity are unchanged. But dealers are even more optimistic over possible price rises. A major factor will be Japanese buying. Talks are reportedly in progress now with some buying decisions expected in the next two weeks. Chances are, however, that the Japanese may buy less scrap in the final quarter.

Detroit — There is strength in some areas of the market following September industrial list activity. Exporters bought, and Canadians are showing fresh interest in Detroit material. Industrial bundles brought only pennies-a-ton more in September than in August in some cases. A major mill snubbed No. 1 bundles this time.

Cleveland—Auto lists showed a gain of around $1 over last month. This is less than expected. The bulk of the higher priced tonnage will probably go out of the district. Top industrial scrap is in demand, but dealer grades go only in small quantities. A Valley mill bought low phos scrap for $43; others have been buying smaller tonnage at that level to fill in.

Cincinnati—Major area list sold for $41 on the track and should stay in the area. Dealer prices are at quoted levels except for No. 2 heavy melting which is off $1. One area mill is in the dealer market.

St. Louis—Pressure from outside areas and slow movement of scrap forced mills to hike prices $1 to $2. Dealers feel that this is not a continued upward trend. They expect scrap to move more freely at the new prices.

Birmingham — Brokers say the market looks strong. But they refuse to predict higher prices because no one is buying in quantity.

Buffalo — One of the district's larger customers came into the market for the first time in three months. Small tonnage of No. 2 bundles and turnings was bought at quoted prices.

Boston — The market has new strength. For the first time in weeks, prices of most top dealer grades climbed. Renewed domestic interest is responsible for the new gains.

West Coast — Dealers are completing export orders and are awaiting new Japanese commitments. Prices are strong. Major mills expect to buy good-sized tonnages in September.

Houston—The domestic market is still relatively quiet. The district mill says receipts under current orders are steady. Increased foundry business resulted in a higher price for cupola cast.

SCRAP PRICES *(Effective Sept. 1, 1961)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	38.00 to 39.00
No. 1 factory bundles	47.00 to 48.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	37.00 to 38.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	19.00 to 20.00
Low phos. punch'gs plate	45.00 to 46.00
Heavy turnings	32.00 to 33.00
No. 1 RR hvy. melting	42.00 to 43.00
Scrap rails, random lgth.	46.00 to 47.00
Rails 2 ft and under	52.00 to 53.00
RR specialties	46.00 to 47.00
No. 1 machinery cast	45.00 to 46.00
Cupola cast	37.00 to 38.00
Heavy breakable cast	33.00 to 34.00
Stainless	
18-8 bundles and solids	190.00 to 195.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	85.00 to 90.00
410 turnings	55.00 to 60.00

Chicago

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	40.00 to 42.00
No. 1 factory bundles	45.00 to 46.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	39.00 to 40.00
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	20.00 to 21.00
Low phos. forge crops	49.00 to 50.00
Low phos. punch'gs plate, ¼ in. and heavier	47.00 to 48.00
Low phos. 2 ft and under	45.50 to 46.50
No. 1 RR hvy. melting	43.00 to 44.00
Scrap rails, random lgth.	49.00 to 50.00
Rerolling rails	61.00 to 62.00
Rails 2 ft and under	52.00 to 53.00
Angles and splice bars	47.00 to 48.00
RR steel car axles	61.00 to 62.00
RR couplers and knuckles	47.00 to 48.00
Cupola cast	43.00 to 44.00
Cast iron wheels	35.00 to 36.00
Malleable	48.00 to 49.00
Stove plate	38.00 to 39.00
Steel car wheels	46.00 to 47.00
Stainless	
18-8 bundles and solids	190.00 to 195.00
18-8 turnings	110.00 to 115.00
430 bundles and solids	95.00 to 100.00
430 turnings	55.00 to 60.00

Philadelphia Area

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	43.00 to 44.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	13.00 to 14.00
Mixed bor. short turn.	16.00 to 17.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Clean cast. chem. borings	29.00 to 30.00
Low phos. 5 ft and under	43.00 to 44.00
Low phos. 2 ft punch'gs	45.00 to 46.00
Elec. furnace bundles	44.00 to 45.00
Heavy turnings	27.00 to 28.00
RR specialties	44.00 to 45.00
Rails, 18 in. and under	52.00 to 54.00
Cupola cast	39.00 to 40.00
Heavy breakable cast	40.00 to 41.00
Cast iron car wheels	42.00 to 43.00
Malleable	48.00 to 49.00
No. 1 machinery cast	49.00 to 50.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	9.00 to 10.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Low phos. 18 in. and under	42.00 to 43.00
Rails, random length	42.00 to 43.00
Rails, 18 in. and under	47.00 to 48.00
No. 1 cupola cast	33.00 to 34.00
Heavy breakable cast	30.00 to 31.00
Drop broken cast	44.00 to 45.00

Youngstown

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	27.50 to 28.50
No. 1 dealer bundles	40.00 to 41.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	18.00 to 19.00
Low phos. plate	42.00 to 43.00

Cleveland

No. 1 hvy. melting	$37.50 to $38.50
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	37.50 to 38.50
No. 1 factory bundles	42.50 to 43.50
No. 2 bundles	22.50 to 23.50
No. 1 busheling	37.50 to 38.50
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Cut structural & plates, 2 ft & under	41.00 to 42.00
Low phos. punch'gs plate	38.50 to 39.50
Drop forge flashings	37.50 to 38.50
Foundry steel, 2 ft & under	34.50 to 35.50
No. 1 RR hvy. melting	40.00 to 41.00
Rails 2 ft and under	49.00 to 50.00
Rails 18 in. and under	52.00 to 53.00
Steel axle turnings	27.00 to 28.00
Railroad cast	48.00 to 49.00
No. 1 machinery cast	48.00 to 49.00
Stove plate	39.00 to 40.00
Malleable	51.00 to 52.00
Stainless	
18-8 bundles	175.00 to 180.00
18-8 turnings	100.00 to 105.00
430 bundles	80.00 to 85.00

Buffalo

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 busheling	31.00 to 32.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	14.00 to 15.00
Cast iron borings	15.00 to 16.00
Low phos. plate	37.00 to 38.00
Structural and plate, 2 ft and under	39.00 to 40.00
Rails 2 ft and under	48.00 to 49.00
Scrap rails, random lgth.	38.00 to 39.00
No. 1 machinery cast	43.00 to 44.00
No. 1 cupola cast	37.00 to 38.00

St. Louis

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	31.00 to 32.00
Foundry steel, 2 ft	33.00 to 34.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	16.50 to 17.50
Shoveling turnings	18.50 to 19.50
Cast iron borings	26.00 to 27.00
No. 1 RR hvy. melting	40.00 to 41.00
Rails, random lengths	42.00 to 43.00
Rails, 18 in. and under	45.00 to 46.00
RR specialties	43.00 to 44.00
Cupola cast	37.00 to 38.00
Heavy breakable cast	32.00 to 33.00
Stove plate	32.00 to 33.00
Cast iron car wheels	34.00 to 35.00
Rerolling rails	56.00 to 57.00
Unstripped motor blocks	34.00 to 35.00

Birmingham

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	38.00 to 39.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	38.00 to 39.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	10.00 to 11.00
Electric furnace bundles	38.00 to 39.00
Elec. furnace, 3 ft & under	36.00 to 37.00
Bar crops and plate	44.00 to 45.00
Structural and plate, 2 ft	43.00 to 44.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rail, random lgth.	42.00 to 43.00
Rails, 18 in. and under	46.00 to 47.00
Angles and splice bars	44.00 to 45.00
No. 1 cupola cast	42.00 to 43.00
Stove plate	42.00 to 43.00
Cast iron car wheels	34.00 to 35.00
Unstripped motor blocks	31.00 to 32.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	24.00 to 25.00
No. 2 dealer bundles	18.00 to 19.00
Mixed bor. and turn.	5.00 to 6.00
Machine shop turnings	5.00 to 6.00
Shoveling turnings	7.00 to 8.00
Clean cast. chem. borings	19.00 to 20.00
No. 1 machinery cast	38.00 to 39.00
Mixed yard cast	34.00 to 35.00
Heavy breakable cast	32.00 to 33.00
Stainless	
18-8 prepared solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 prepared solids	65.00 to 70.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	33.00 to 34.00
Drop forge flashings	33.00 to 34.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	14.00 to 15.00
Heavy breakable cast	28.00 to 29.00
Mixed cupola cast	31.00 to 32.00
Automotive cast	41.00 to 42.00
Stainless	
18-8 bundles and solids	170.00 to 175.00
18-8 turnings	70.00 to 75.00
430 bundles and solids	70.00 to 75.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	30.00 to 31.00
No. 1 busheling	30.00 to 31.00
Machine shop turn.	4.00 to 5.00
Shoveling turnings	8.00 to 8.50
Clean cast. chem. borings	17.50 to 18.00
No. 1 machinery cast	38.00 to 39.00
Mixed cupola cast	30.00 to 31.00
Heavy breakable cast	30.50 to 31.50

San Francisco

No. 1 hvy. melting	$45.00
No. 2 hvy melting	42.00
No. 1 dealer bundles	29.00
No. 2 bundles	25.00
Machine shop turn.	$16.00 to 17.00
Cast iron borings	16.00 to 17.00
No. 1 cupola cast	47.00

Los Angeles

No. 1 hvy. melting	$44.00
No. 2 hvy. melting	41.00
No. 1 dealer bundles	29.00
No. 2 bundles	25.00
Machine shop turn.	15.00
Shoveling turnings	15.00
Cast iron borings	15.00
Elec. furnace 1 ft and under (foundry)	50.00
No. 1 cupola cast	47.00

Seattle

No. 1 hvy. melting	$45.00
No. 2 hvy. melting	42.00
No. 2 bundles	$25.00 to 26.00
No. 1 cupola cast	36.00
Mixed yard cast	31.00

Hamilton, Ont.

Brokers buying prices per net ton on cars:

No. 1 hvy. melting	$31.00
No. 2 hvy. melting cut 3 ft and under	28.00
No. 1 dealer bundles	31.00
No. 2 bundles	23.50
Mixed steel scrap	23.00
Bush., new fact., prep'd	31.00
Bush., new fact., unprep'd	25.00
Machine shop turn.	8.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	32.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	24.00
Machine shop turn.	10.00
Shoveling turnings	13.00
Cut structural plate 2 ft & under	$44.00 to 45.00
Unstripped motor blocks	28.00 to 29.00
Cupola cast	36.00 to 37.00
Heavy breakable cast	28.00 to 29.00

Pressure Builds On Copper Prices

There is wide disagreement on any immediate increases in copper prices.

But the trend is toward a tighter market. And if this continues, many feel prices will be under upward pressure.

■ Are copper prices about to climb? Right now, in domestic circles, there is disagreement.

But the trend seems to be toward a much tighter market. Many observers say that if the current picture remains unchanged, prices will be under pressure.

Some Factors — Copper sellers had a good summer. Shipments and new orders held up very well. And September orders indicate the fourth quarter could be the best period of the year.

But strikes are hanging over the industry. Kennecott is limping along in its large Utah operation. The refinery is still working. But unless other sections get back to work it will run out of material to refine by the middle of the month.

Chile Tale—Early this week, the news from Chile was all bad. Major properties of U. S. producers are still struck. Neither Anaconda nor Kennecott has received any Chilean metal since August 10.

Sources say Russia has closed a deal for 60,000 tons of Chilean copper annually. Half is reported to be refined, the rest crude.

There was no official report on this from the Chile government. But negotiations for such a contract have been going on for some time.

London Firm—Prices on the London Metals Exchange, which many regard as a good barometer of what to expect in the U. S., have been steady. But one copper dealer points out that it usually takes 30 days for copper to get from Chile to European markets. So the continent has not yet felt the effects of work stoppages in Chile.

Traders in New York are trying to build up their stocks. They figure the price can't go down. And it well may go higher before the year is over.

Some dealers report sales at over 31¢ per lb. But they say few consumers are paying premiums. It's mostly other dealers trying to lengthen their position.

Scrap Lack—Some major custom smelters report it is getting more difficult to get scrap. Generation was low in August. Dealers feel that unless labor problems in Chile and the U. S. are settled soon, the price will be moving up. So they are holding back what little scrap they have.

Consumers are making no effort to protect themselves from higher prices. Producers report good orders, but see little inventory building or hedging. This lack of panic by buyers, which is not characteristic of copper markets, is keeping the lid on so far.

Less Activity—The Japanese, who have been monopolizing copper and copper alloy scrap exports, have reduced their activity sharply.

Sources in Japan report that soon after his visit to the U. S., Prime Minister Ikeda requested the Japanese copper industry to go easy on purchases, particularly prices.

The Japanese government apparently plans a sweeping reorganization of trade policy and rules. And it doesn't want anything to upset the plans.

Japanese industry apparently agreed to cooperate. Copper sources in the U. S. mostly deny knowledge of the situation. But say that current Japanese buying patterns tend to bear it out.

World Supply — Perhaps at the bottom of new stability in the face of possible adversity in copper markets is the fact that world capacity is more than adequate to meet world demand.

Tin Prices for the Week

August 29—125.75; August 30—124.75; August 31 — 124.75; September 1—124.25*.
*Estimate.

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in AUGUST based on quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper, del'd Conn. Valley	31.00
Copper, Lake	31.00
Straits, Tin, New York	119.78
Zinc, E. St. Louis	11.50
Lead, St. Louis	10.80
Aluminum Ingot	26.00

Note: Quotations are on going prices.

Primary Prices

(cents per lb.)	current price	last price	date of change
Aluminum Ingot	26.00	24.70	12/17/59
Copper (E)	31.00	30.00	5/16/61
Copper (CS)	31.00	30.00	5/17/61
Copper (L)	31.00	30.00	5/17/61
Lead, St. L.	10.80	11.80	12/13/60
Lead, N. Y.	11.00	12.00	12/13/60
Magnesium Ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	81.25	74.00	6/30/61
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	11.50	12.50	1/12/61
Zinc, N. Y.	12.00	13.00	1/12/61

ALUMINUM: 99% Ingot. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. Other primary prices, pg. 149.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.030-.037	.047-.060	.076-.096	.154-.250
1100, 3003	48.4	47.4	46.4	45.4
5052	55.8	53.0	50.8	47.8
6061-0	53.0	50.3	48.4	47.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/32-5/16	11/32-23/32	3/4-1 1/16	1 3/32-1 1/2
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	147	126	145
Strip, CR	133	114	145
Rod, bar, HR	116	95	116
Angles, HR	116	95	116
Plates, HR	139	116	133
Shot, blocks	...	93	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	56.13	.....	53.61	57.33
Brass, Yellow	49.27	49.56	49.21	53.43
Brass, Low	52.15	52.44	52.09	56.31
Brass, Rod	53.17	53.46	53.11	57.23
Brass, Naval	53.94	60.25	47.75	58.10
Muntz Metal	51.94	.....	47.25	.....
Comm. Bz.	54.73	55.02	54.67	58.34
Mang. Bz.	57.71	61.54	51.27	.....
Phos. Bz. 5%	76.97	76.72	77.47	78.98

Free Cutting Brass Rod 34.77

TITANIUM

(Base 30,000 lb. f.o.b. customer's plant)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17. Plate HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 32.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be ..... $ 5.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $70.00
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base .... $ 1.31
Cobalt, 97-99% (per lb)...$1.50 to $ 1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $29.95 to $36.95
Gold, U. S. Treas, per troy oz. $35.00
Indium, 99.9% dollars per troy oz..$ 2.25
Iridium, dollars per troy oz. ..$75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury dollars per 76-lb flask f.o.b. New York ..... $188 to $191
Nickel oxide sinter at Buffalo, N. Y. or other U. S. points of entry, contained nickel 77.50
Palladium, dollars per troy oz..$24 to $26
Platinum, dollars per troy oz. .$82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.)..... 91.375
Thorium, per pg $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 32.00
- No. 120 ..... 31.25
- No. 123 ..... 30.50

80-10-10 ingot
- No. 305 ..... 36.00
- No. 315 ..... 33.75

88-10-2 ingot
- No. 210 ..... 43.75
- No. 215 ..... 40.50
- No. 245 ..... 35.75

Yellow ingot
- No. 405 ..... 27.50

Manganese bronze
- No. 421 ..... 31.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95.5 aluminum-silicon alloys —
- 0.30 copper max. 23.25-23.75
- 0.60 copper max. 23.00-23.50

Piston alloys (No. 132 type)...25.00-26.00
No. 12 alum. (No. 2 grade)...21.25-21.75
108 alloy 21.75-22.25
195 alloy 24.25-24.75
13 alloy (0.60 copper max.)...23.00-23.50
AXS-679 (1 pct zinc) 21.50-22.50

Steel deoxidizing aluminum notch bar granulated or shot
- Grade 1—95-97½% 22.75-23.75
- Grade 2—92-95% 21.50-22.50
- Grade 3—90-92% 20.50-21.50
- Grade 4—85-90% 19.50-20.50

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27	26¼
Yellow brass	20⅜	18½
Red brass	23⅞	22⅛
Comm. bronze	24¾	24
Mang. bronze	19¼	18½
Free cutting rod ends	19½	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 28¾
- No. 2 copper wire 27
- Light copper 24¾
- *Refining brass 25¾
- Copper bearing material 24¾

*Dry Copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 28¾
- No. 2 copper wire 27
- Light copper 24¾
- No. 1 composition 25½
- No. 1 comp. turnings 25
- Hvy. yellow brass solids 20
- Heavy yellow brass turnings. 18½
- Radiators 22

Aluminum

- Mixed old cast. ..... 12½—13
- Mixed new clips ..... 14½—15
- Mixed turnings, dry ..... 13 —14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass
- No. 1 copper wire ..... 24¾—25¼
- No. 2 copper wire ..... 22¾—23¼
- Light copper ..... 20½—21
- Auto radiators (unsweated) . 16½—17
- No. 1 composition ..... 21¼—21⅝
- No. 1 composition turnings .. 20¾—21¼
- Cocks and faucets ..... 17¼—17⅝
- Clean heavy yellow brass .... 15¼—15½
- Brass pipe ..... 17¼—17⅝
- New soft brass clippings .... 18⅜—19¼
- No. 1 brass rod turnings .... 16½—17

Aluminum
- Alum. pistons and struts .... 7 — 7½
- Aluminum crankcase ..... 9½—10
- 1100 (2s) aluminum clippings 11¾—12¼
- Old sheet and utensils ..... 9½—10
- Boring and turnings ..... 4½— 5
- Industrial castings ..... 10 —10½
- 2020 (24s) clippings ..... 11 —11½

Zinc
- New zinc clippings ..... 5 — 5¼
- Old zinc ..... 3 — 3¼
- Zinc routings ..... 1¾— 2
- Old die cast scrap ..... 1¾— 2

Nickel and Monel
- Pure nickel clippings ..... 56 —58
- Clean nickel turnings 43
- Nickel anodes ..... 56 —58
- Nickel rod ends ..... 56 —58
- New Monel clippings ..... 36 —26½
- Clean Monel turnings ..... 18½—19
- Old sheet Monel ..... 25 —25½
- Nickel silver clippings, mixed. 20
- Nickel silver turnings, mixed. 17

Lead
- Soft scrap lead ..... 7¼— 7½
- Battery plates (dry) ..... 3 — 3¼
- Batteries, acid free ..... 2 — 2¼

Miscellaneous
- Block tin ..... 90 —92
- No. 1 pewter ..... 65 —67
- Auto babbitt ..... 46 —47
- Mixed common babbitt ..... 10 —10½
- Solder joints ..... 15 —15½
- Small foundry type ..... 9 — 9½
- Monotype ..... 9¼— 9⅝
- Lino. and stereotype ..... 8½— 8⅝
- Electrotype ..... 8 — 8¼
- Hand picked type shells .... 5⅝— 6¼
- Lino. and stereo. dross ..... 1¾— 2¼
- Electro dross ..... 2½— 3

(Effective Sept. 1, 1961)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES, STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$99.50 *A2*	$121.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*	8.10 *P2*	5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.425 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1, P11, B9*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3, Y1*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Struthers, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*		5.50 *Y1*			5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, N. Castle, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *B4, M10*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras

(Effective Sept. 1, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Electro-galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.		Coke*‡ 1.25-lb. base box	Electro** 0.25-lb. base box	Thin 0.25 lb. coating in coils
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*					7.525 *B3*	9.275 *B3*	6.40 *W6, S15*	†Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price 0.75 lb. 0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. ‡ COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		Prices are for 50 lb. base box; for 45 lb. deduct 15¢; for 55 lb. add 15¢; for 60 lb. add 30¢.
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*					7.575 *A2*					
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*					7.575 *U1*	9.325 *U1*			$9.10 *U1*	$6.25 *U1*
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*		6.775 *B3*		7.525 *B3*	9.275 *B3* 10.025 *B3**	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	$6.25 *B3*
	Worcester, Mass.									6.70 *A5*			
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*		6.775 *A7*		7.525 *A7*					
	Canton-Massillon, Dover, Canfield, Ohio			6.875 *R1, R3*	7.50 *C19*								
	Chicago, Joliet, Ill.	5.10 *W8, A1*						7.525 *U1, W8*		6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*		7.65 *R3*	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*	6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*					7.525 *G3*	9.275 *G3*				
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*		6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*	6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1 Y1,*	$6.25 *U1, I3*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*				7.225 *E2*						
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	7.225 *A7*	6.775 *A7*	7.225 *A7*						
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3*	7.65 *R3*	6.775 *S1*	7.225 *S1†† R3*	7.525 *R3, S1*	9.275 *R3*			$9.10 *R3*	
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3*	7.50 *E3*	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3* 10.125 *U1, J3**	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	$6.25 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5*	7.50 *W3*		7.225 *W3*	7.525 *W3*	9.275 *W3*		$10.40 *W5, W3*	$9.10 *W5, W3*	$6.40 *W5*** $6.25 *W3*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*			6.775 *Y1*		7.525 *Y1*	9.275 *Y1*	6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*					8.25 *K1*	10.40 *K1*		$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*		6.775 *T2*				6.40 *T2, R3*	$10.40 *T2*	$9.10 *T2*	$6.25 *T2*
	Houston, Texas									6.65 *S2*			

Hollowware Enameling
29 ga.—7.85 *U1* at Gary; Pittsburgh; *J3* at Aliquippa; *W5* at Yorkville; *Y1* at Indiana Harbor; *W5* at Wheeling; 7.95 *G2* at Granite City.

* Hi Str. Low Alloy Galv. ** For 55 lb.; for 60 lb. add 15¢.

†† 7.425 at Sharon; Niles is 7.225.

(Effective Sept. 1, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.		Listing reinforcing bar prices has been suspended. Major producers now quote prices only in response to specific inquiries.		6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3, S15*		7.70 *B5*	6.725 *B3,R3, S15*	9.025 *B3,B5, S15*	8.30 *B3*	5.30 *B3*				8.00 *W6, S15*
	Claymont, Del.							5.30 *P2*	6.375 *P2*	7.50 *P2*	7.95 *P2*	
	Conshohocken, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Milton, Pa.	5.825 *M7*						5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*			6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Steelton, Pa.											
	Fairless, Pa.	5.825 *U1*										
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.							5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*		7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*		7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*		7.90 *P3* 7.85 *P8,B5H2* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8, H2* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*		7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, Y1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.											8.10 *C9*
	Sterling, Ill.	5.775 *N4*					7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*		7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Youngstown, Steubenville, O.	5.675 *U1,R3, Y1*		7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1,W5, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.375 *K1*			7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*			6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*		9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*						6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*										
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*					9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*			7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga. Jacksonville, Fla.	5.875 *A8*										8.00 *A8* 8.35 *M4*
	Fairfield, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*		8.10 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas, Sand Springs, Okla.	5.925 *S2*			6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Sept. 1, 1961) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brooke Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
B9 Barry Universal Corp., Detroit, Mich.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.
C19 Canfield Steel Co., Canfield, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit
H2 Hercules Drawn Steel Corp., Toledo, O.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M10 Mill Strip Products Co., of Pa., New Castle, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.
S15 Seaway Steel Div., Roblin-Seaway Ind., Inc., North Tonawanda, N. Y.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery; Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled, 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore	$.10	9.60	10.16	10.16	11.35	9.70	9.95	8.65	11.80	17.48	16.48	21.58	20.83
Birmingham		8.46	10.20	10.59	9.45	8.41	8.47	8.26	13.14	18.84	16.65	22.94	22.19
Boston**	.10	10.00	10.50	11.62	12.50	9.95	10.60	10.15	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	9.45	10.20	11.95	11.85	9.55	10.05	9.60	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	9.37	10.35	10.28	11.54	9.21	9.72	9.37	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	9.53	10.41	10.33	11.86	9.59	10.29	9.48	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	9.37[1]	10.81	11.07	11.66	9.45	10.11	9.48	11.40	17.21	16.21	21.31	20.56
Denver		11.55	12.53	13.03	13.72	11.39	11.90	11.55	12.98	.....	.....	.....	20.84
Detroit**	.15	9.63	10.61	10.65	11.91	9.58	10.29	9.68	11.16	17.38	16.38	21.48	20.73
Houston**		8.67	9.48	11.35[3]	10.23	7.91	8.31	8.08	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	10.53	11.37	10.95	12.70	10.39	10.91	10.55	11.72	17.17	15.87	21.87	21.12
Los Angeles		10.35[1]	12.15	12.10	12.40	10.30	10.45	10.25	14.20	18.30	17.35	22.90	22.20
Memphis	.15	9.78	10.50	10.95	11.44	9.47	9.82	9.67	12.85	18.59	16.68	22.69	21.84
Milwaukee**	.15	9.51	10.49	10.42	11.68	9.35	9.94	9.51	11.84	17.24	16.24	21.34	20.59
New York**	.10	10.17	10.88	11.45	12.47	10.32	11.00	10.54	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	9.60	10.10	10.76	11.35	9.70	9.95	9.75	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	9.37	10.81	11.68	11.64	9.21	9.72	9.37	11.40	17.10	16.10	21.20	20.45
Portland		10.40	12.25	12.35	12.40	10.55	11.00	10.40	16.65	18.60	17.85	22.70	22.15
San Francisco	.10	10.75	11.75[2]	11.95	12.80	10.90	11.20	10.65	15.20	18.30	17.35	22.90	22.20
Seattle		11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	18.60	17.85	22.70	22.15
Spokane	.15	11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.35	17.75	17.95	21.58	22.30
St. Louis**	.15	9.57	10.73	10.66	11.74	9.43	9.95	9.59	11.43	17.48	16.48	21.58	20.83
St. Paul	.15	9.72	10.39	11.54	11.89	9.56	10.07	9.72	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **These cities are on order quantity pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅜"; cold drawn—15/16" to 2⅜" round; Hot-rolled 4140—⅝" to 2⅜" round. cold drawn—15/16" to 2⅜" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier: [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective Sept. 1, 1961)

PIG IRON

Dollars per gross ton, f.a.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	71.00†
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	73.00
Lyles, Tenn. *T3*	.....	.....	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	71.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4*, Toledo, *I4*, $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct; 13 to 13.5 pct; 13.5 to 14 pct, add $1. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish—packaged and bulk	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

(Minimum plating charge — $10.00 per item. Price on application assembled to bolts.)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46
Machine Screws—bulk		
¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 *lb*
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

NOTE: Ferroalloy prices are published in alternate issues.

TOOL STEEL

f.o.b. mill

W	Cr	V	Mo	Co	per lb	AISI
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2

High-carbon chromium	.955	D-3, D-5
Oil hardened manganese	.505	O-2
Special carbon	.38	W-1
Extra carbon	.38	W-1
Regular carbon	.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Sept. 1, 1961)

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	25.00	28.25	26.00	29.50	32.00	29.50	47.50	38.00	46.50	—	19.25–21.50	—	19.75–21.75
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	26.75	29.25–26.75	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	31.50	35.00–31.50	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25–31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	43.50	46.75	45.00	49.50	56.75	49.50	76.75	62.25	75.25	40.25	40.25	42.50	38.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	29.75	33.25–29.75	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown. *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6;* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown. *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1:* Claymont, Del: *P2.*

Forging billets: Ambridge Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld	Merch. Wire Galv.
	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	...	...	190	9.00	9.675
Atlanta *A8***	173	191	...	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	...	...	...	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	...	...	...	9.00	9.55
Chicago *W7*	173	.....	...	...	...	9.00	9.55†
Cleveland *A6*	.....	.....	...	...	...	.....	.....
Cleveland *A5*	.....	.....	...	...	...	9.00	.....
Crawf'dav. *M4***	175	192	...	214	198	9.10	9.80
Donora Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	...	...	...	.....	.....
Houston *S2**	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	175	192	...	214	198	9.10	9.80††
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	...	...	...	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	.....	.....	...	...	...	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.95	10.50
Rankin Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	.....	.....	...	236	...	9.95	10.50
Sparrows Pt. *B3***	175	.....	...	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	...	...	...	8.65	9.20
Worcester *A5*	179	.....	...	...	...	9.30	9.85
Williamsport *S5*	.....	.....	...	...	...	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only. †† 0.115¢ zinc.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

* Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.6
Chicago	140.0
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: P. S. Pipe and Foundry Co.

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

C ELECTRIC FURNACE STEEL CASTINGS

are engineered to *YOUR* specific requirements

"C" steel castings are CLEAN steel castings of uniform structure that will minimize machining and assembly costs, permit of greater freedom and efficiency of design and add to your product the recognized strength, endurance and desirability of steel. C steel castings, foundry engineered from pattern to finished casting can be had in

CARBON, ALLOY OR STAINLESS STEEL SAND OR SHELL MOULDED

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CRUCIBLE STEEL CASTING CO.
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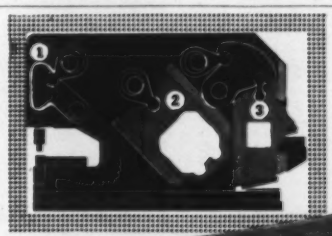
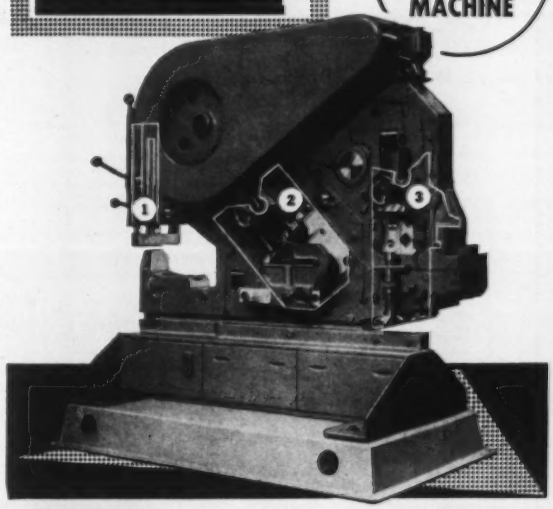


3 CLUTCH MACHINE



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E. G. Heller's Son, Inc., 7039 E. Slauson, L.A. 22, Calif.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25			
Cleveland *R3*						15.35
So. Chicago *R3*				10.10		
Ensley *T2*	5.75	6.725				
Fairfield *T2*		6.725		10.10	6.875	
Gary *U1*	5.75				6.875	
Huntington, *C16*		6.725				
Ind. Harbor *I3*				10.10		
Johnstown *B3*		6.725				
Joliet *U1*			7.25			
Kansas City *S2*				10.10		15.35
Lackawanna *B3*	5.75	6.725	7.25		6.875	
Lebanon *B3*			7.25			15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*						15.35
Pittsburgh *J3*				10.10		
Seattle *B2*					7.025	15.85
Steelton *B3*	5.75		7.25		6.875	
Struthers *Y1*				10.10		
Torrance *C7*					6.75	
Williamsport *S5*		6.725				
Youngstown *R3*				10.10		

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	9.10				
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*		10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70		
Detroit *D1*	9.05	10.50	12.70	15.70	
Detroit *D2*	9.05	10.50	12.70		
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	15.60	
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*			12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	
New Castle, Pa. *M10*	8.95	10.40	12.60	15.60	
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*		10.70	12.90	16.10	19.30
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper

Rolled elliptical, 18 in. or longer, 5000 lb lots 43.50
Electrodeposited, 5000 lb lots 36.50
OFHC anodes ..... 41.50 to 44.50 (depending on shape)
Brass, 80-20, ball anodes, 2000 lb or more 50.50
Zinc, ball anodes, 2000 lb lots ..... 18.75 (for elliptical add 1¢ per lb)
Nickel, 99 pct plus, rolled carbon, 5000 lb ..... 1.03 (Rolled depolarized add 3¢ per lb)
Cadmium, 5000 lb 1.60
Tin, ball anodes $1.26 per lb (approx.).

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum, N. Y.. 65.90
Copper sulphate, 25.2 Cu min, 6000 lbs per cwt, Detroit 17.45
Nickel sulfate, 5000 lbs 31.00
Nickel chloride, freight allowed, 100 lb 47.50
Sodium cyanide, domestic, del'd east of Rockies, 200 lb drums.... 25.80
Zinc cyanide, 100 lb, N. Y. 60.75
Potassium cyanide, 100 lb drum N. Y., del'd east of Rockies..... 46.50
Chromic acid, flake type, 10,000 lb or more, N. Y. 30.44

METAL POWDERS

(Cents per lb, f.o.b. shipping point for ton lots or over, except as noted)

Iron Powders

Molding grade, domestic and foreign, 98 pct Fe, 100 mesh bags, freight allowed east of Miss. R. 11.50
Electrolytic Iron, melting stock, 99.87 pct Fe, truckload lots 25.75
Carbonyl Iron (200 lb lots) 88.00
Welding Grades 8.10
Cutting and Scarfing Grades 9.85
Hydrogen reduced, domestic 11.25

Copper Powders

Molding Grades
Electrolytic, domestic, f.o.b. shipping point. 15.00†
Atomized ..... 44.3 to 62.3
Reduced ..... 15.00†
Chemically Precipitated 45.5
Brass, 5000-lb lots ..... 33.1 to 50.3
Bronze, 5000-lb lots ..... 51.5 to 56.8
Chromium, electrolytic 5.00
Lead ..... 7.50†
Manganese, electrolytic ... $1.00
Molybdenum ..... $3.60 to $4.35
Nickel $1.15
Carbonyl Nickel, 20,000 lb lots $1.01
Nickel-Silver, 5000 lb lots.. 56.0 to 68.0
Silicon 70.00
Solder ..... 7.00†
Stainless Steel, 316 ..... $1.07
Stainless steel 304 ..... 89.90
Tin ..... 15.00†
Titanium, 99.25 + pct, per lb, f.o.b. $11.25
Tungsten, carbide grades... $3.25
Zinc ..... 19.5 to 32.7

† Plus cost of metal.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30		
		Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Manafield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

CLAD STEEL

Base prices, cents per lb f.o.b.

Cladding	Plate (*L4, P2, A3, J2*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
302	.....	.....	.....	37.50
304	28.80	31.55	34.30	39.75
316	42.20	46.25	50.25	58.25
321	34.50	37.75	41.05	47.25
347	40.80	44.65	48.55	57.00
405	24.60	26.90	29.25	.....
410	22.70	24.85	27.00	.....
430	23.45	25.65	27.90	.....

Stainless Type

CR Strip (S9) Copper, 10 pct, 2 sides, $43.85; 1 side, $36.60.

(Effective Sept. 1, 1961)

REFRACTORIES

Fire Clay Brick

	Carloads per 1000
Super duty, Mo., Pa., Md., Ky....	$185.00
High duty (except Salina, Pa., add $5.00)	133.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk...	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays	163.00
Chicago District	168.00
Western Utah	183.00
California	185.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O.	163.00-168.00
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union, Pa.	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Standard chemically bonded, Baltimore, Md.	$620.00
Gary, Ind.	658.50
Standard, Pascagoula, Miss.	647.50
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Baltimore	585.00

Magnesite Brick

Standard, Baltimore	$715.00
Chemically bonded, Baltimore	655.00
Chemically bonded, Pascagoula, Miss.	682.50

Grain Magnesite

St. ⅜ to ½-in. grains

	Per net ton
Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b., Pascagoula, Miss...	80.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100, 110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox..	2	13	40.28	47.21	35.74
Jones & Laughlin *	2½	12	54.23	63.57	48.13
Ohio Seamless Tube	3	12	62.62	73.40	55.59
Div., Copperweld Steel Co.*	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube.....	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel...	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

* Electricweld only.

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BORER, No. 321 Heald single end, hydraulic, precision
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DRILLS, multiple, Mod. BZA Nateo "Holesteel," hyd. '45
DRILL, radial, 4'-13" Carlton extra high col., MD
DRILL, upright, 22" No. 22½ Barnes box col., '52
DRILL, Allen Model 3VCCE, 5 spdl., auto.
GEAR GEN., 12" Gleason hydraulic, str. bevel, '45
GEAR HOBBER, Model 7A Lees Bradner, new '52
GEAR GEN. No. 5B Sykes or Farrel Birmingham (3)
GRINDER, centerless, No. 4 Cincinnati Filmatic
GRINDER, centerless, No. 12 Landis, hyd. '48
GRINDER, cylindrical, 22" x 72" Landis Type C
GRINDER, internal, No. 74 Heald, '41
GRINDER, internal, Bryant Mod. 1120Y, new '53
GRINDER, surface, 16" No. 261 Heald rotary, '49
GRINDER, surface, 30" Mod. 18 Blanchard, MD
GRINDER, T. & C. Cincinnati Monoset
GRINDER, Mod. 2ER Springfield vertical univ. hyd., '52
GRINDER, thread, Mod. TG636 J & L, auto. (2)
LATHE, automatic, 20 x 25 Gay, '42
LATHE, 16" x 54" cc American Pacemaker
LATHE, 15" x 30" cc Lipe Carbomatic hyd. prod.
LATHE, 36 Bullard vtl., 20 HP
LATHE, turret, Model 6DREL Potter & Johnston, mfg. auto.
LATHE, 60" Mod. T. L & S right angle, chucking
MILL, No. 33 Sundstrand "Fluidscrew"
MILL, 4" Universal Tri-Way horizontal
MILL, 60" Colburn vertical boring
MILL, No. 4 Cincinnati dual power, 30 HP, H.S. dial type
MILL, 72" Ingersoll 2 spdl. rotary
PLANER, 42" x 42" x 14' Cincinnati "Hypro"
PRESS, coining, 2000 tons Bliss air cl., '51 (new)
PRESS, drawing, 260 ton, No. 795½-72 Toledo D.C.
PRESS, high speed, 125 ton H&W, No. 106
PRESS, straightening, 10 ton Anderson hyd. "C" frame
PRESS, 350 ton Elmes hyd.
PRESS, S.S., 125 ton Clearing crankless (2)
PRESS, S.S., 300 ton Mod. 40-8½ Minster air cl.
PRESS, gap, 150 ton Toledo No. 79
SHAPER, 66" Rockford hyd., Hy. Dy.
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Sales Pick Up In Cincinnati Area

Used machinery sales in the Cincinnati area are now running about 25 pct ahead of the first half of the year.

But profit margins are still thin because of competition from new machinery dealers.

■ Sales of used machinery in the Cincinnati area are rallying during the second half of the year. Sales are actually up 25 pct over the first period.

But profit margins are still thin. This is because of surplus offerings and competition from new equipment dealers.

A sideline with "fantastic activity": Research and development instruments and equipment. In fact, many companies with recent contracts have agents looking all over the country for used equipment that will fill the need. They are doing this rather than waiting three to five months for delivery of new machinery.

Auctions—But much of the activity in this area is taking place at auctions where the users are buying direct. And they often pay more for the tools at auctions than if they bought from used machinery dealers.

"We are finding some tremendous prices bid at auctions for small and medium size tools that are nine to 15 years old," says Harold K. Hirschberg, Joseph P. Day Co. of Ohio, Cincinnati.

"Sales generally are up 25 pct over the first six months of this year. Tools with a few years use are going for about 60 pct to 70 pct of the cost of new tools. Older machinery is selling for about 50 pct of the original cost of new equipment.

"Tools most in demand are lathes, milling machines, grinders, press brakes, shears, rolls, cutting and pantagraph units. Anything fitting in with automation is especially desirable."

Frantic Buying—In the instrument field, says Mr. Hirschberg, some companies are so frantic to get R&D equipment that some builders even have agents attending auctions and sales buying back their own equipment. These tools are then rebuilt and sold or leased to companies with hot research projects.

Another interesting note from the Cincinnati area is increased inquiries from foreign sources. Joseph Malloy, Economy Machinery Co., Inc., says there have been "quite a few" of these inquiries lately.

He adds: "The turnover of used machinery is good now, but profit margins are thin."

"Let's blame it on Neal. He's the only one on vacation."

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298 CFM	75 psi	10 x 9 Ing. ES-1	
368 CFM	100 psi	12 x 10 Ing. Rand ERI	
405 CFM	100 psi	12 x 11 IR—Worth—CP	
528 CFM	100 psi	14 x 12 Penn. 3A	
502 CFM	125 psi	12 x 13 Ing. Rand. Worth.	
676 CFM	110 psi	15-9¼ x 12 IR-XRE	
		125 HP Syn. 3-60-440	
836 CFM	100 psi	14 x 13 IR. Worth HB	
805 CFM	125 psi	17-10 x 12 Ch. Pn. OCE.	
		150 HP 3-60-2300 Syn.	
877 CFM	125 psi	17/10½x14—IR—XRB.	
1352 CFM	125 psi	18½-11½ x 8½—IR—XLE	
		200 HP G.E. Syn. 3-60-4160	
1750 CFM	125 psi	15½-10 x 10 CP—WCE.	
		300 HP G.E. Syn. 3-60-2300	
2200 CFM	110 psi	28-15 x 18 CP—OCE.	
		350 HP Syn. 3-60-4600	

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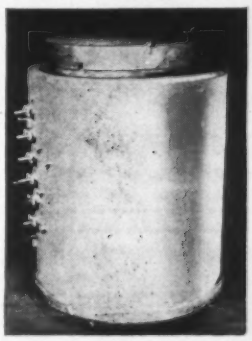

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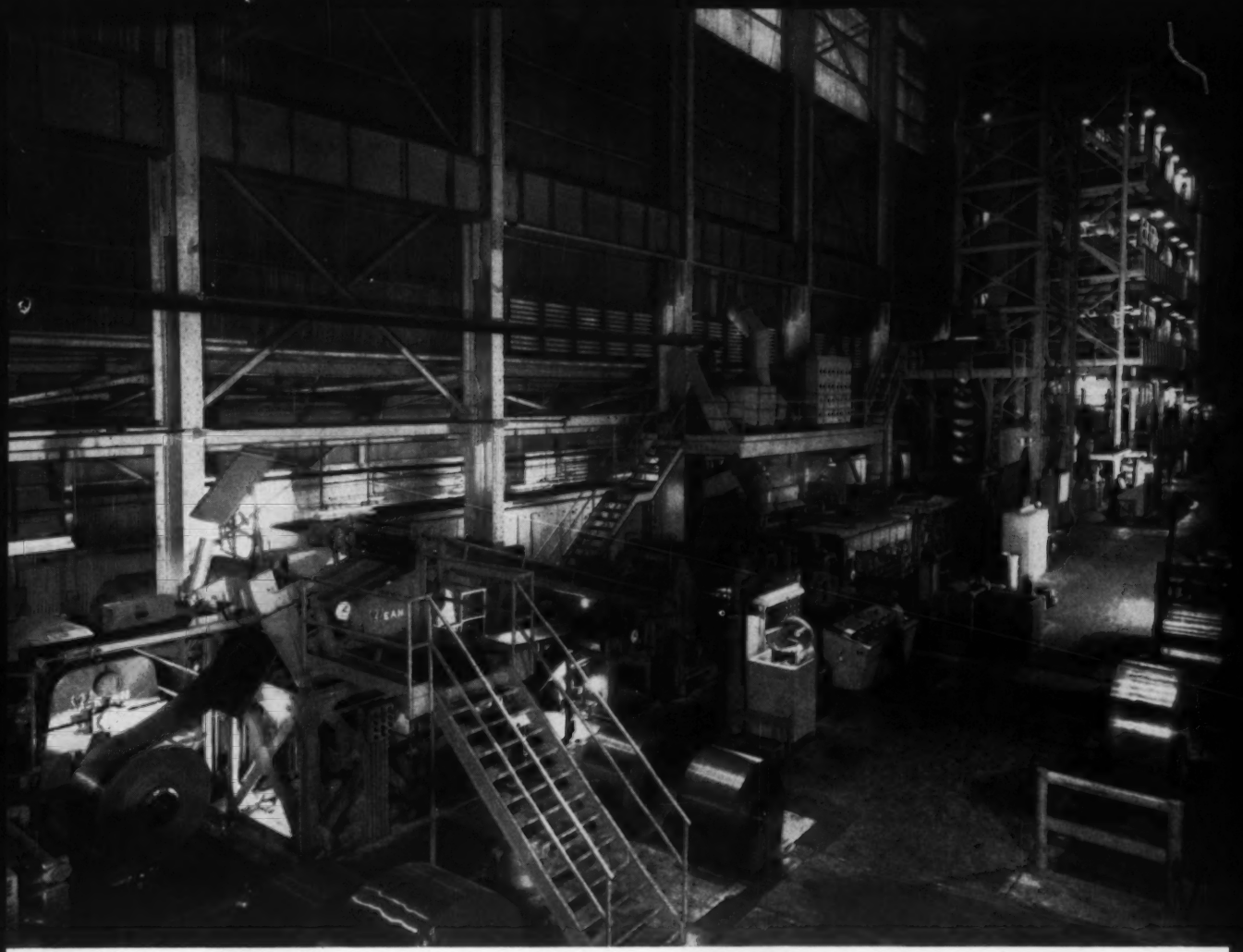

J&L adds modern Wean Annealing Line as major part of tin plate expansion

Recently installed at Jones & Laughlin Steel Corporation's Aliquippa, Pennsylvania plant, this high-speed continuous annealing line represents a major step in J&L's tin plate expansion program. The line is designed to operate at speeds up to 2000 fpm, and it can handle coils weighing up to 50,000 lb with a maximum O.D. of 85″.

Strip tension is controlled within the major zones of the line by six precision bridles. The bridle controls are interlocked to provide optimum operating tensions in the looping towers, cleaning zone and furnace. This accurate tension control, coupled with other design features, assures positive tracking of the strip throughout the length of the line.

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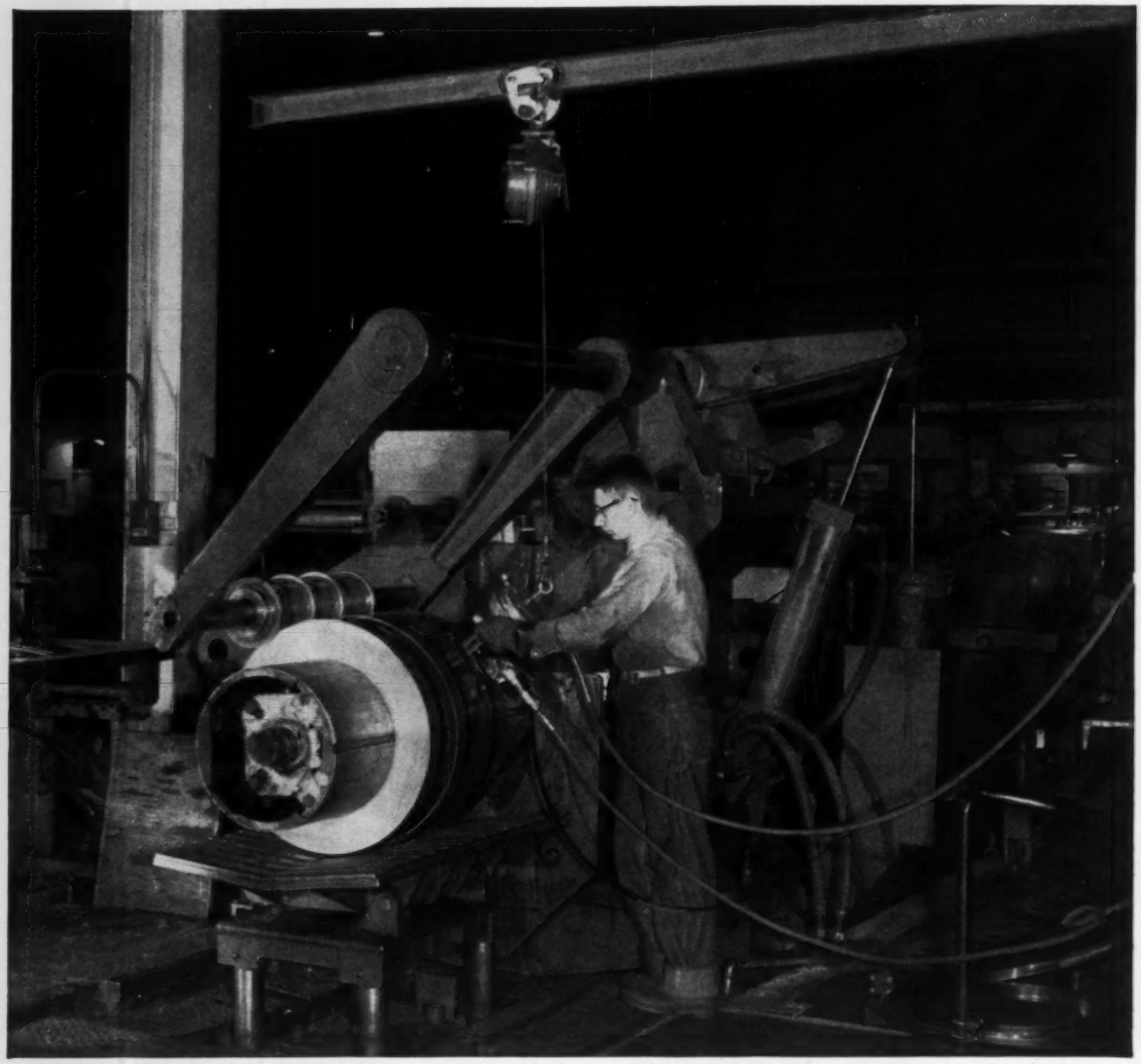

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